

February 1960

Iway **TRACK** and

The battle against brush

p. 23-

STRUCTURES

Burned-out trestle
is rebuilt fast

p. 32



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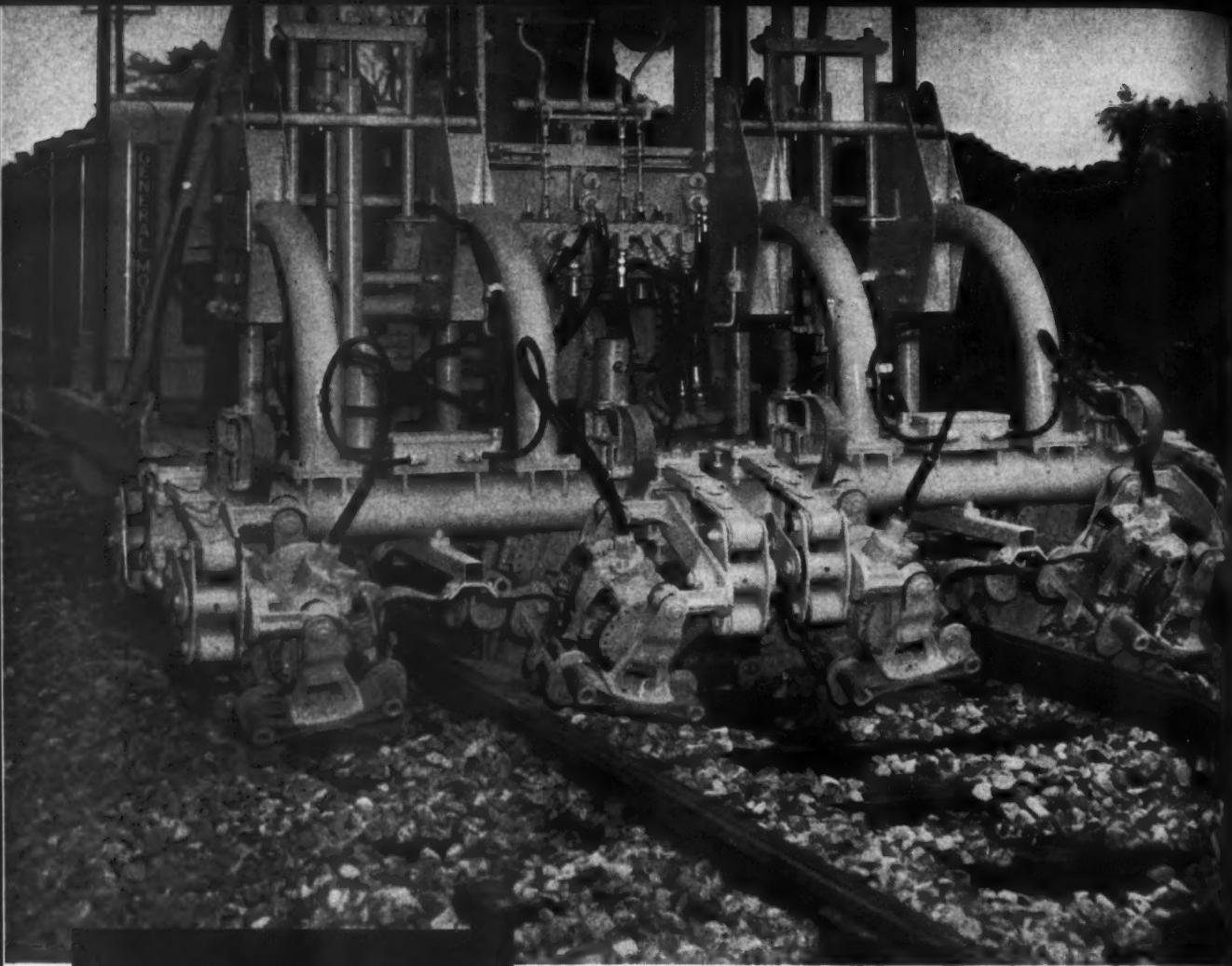
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BETHLEHEM STEEL



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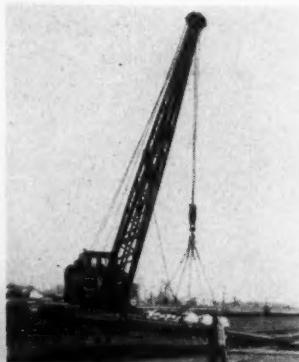
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The battle against brush	23
It's a growing problem	Explains why the growth of brush is threatening literally to take over thousands of miles of railroad right of way in the United States.
Many types of powered cutters are in use	24
	Tells about some of the mechanized equipment used to cut brush and the increasing practice of spraying the stumps with herbicide.
Chemicals prove powerful ally	26
	An authority on brush control describes the herbicides that are available and how they are used for the greatest effectiveness.
Fast way to take old track apart	30
	The B&O uses a specially designed "ripper" for separating the rails from the ties when it has to take up long sections of track.
Burned-out trestle is rebuilt fast	32
	A fortuitous circumstance enabled bridge crews of the L&N to restore a burned-out trestle, 636 ft long, to service in less than 120 hr.
Arch failure blocks 1500-ft tunnel	34
	Describes the methods used by the P&WV to restore one of its tunnels to service after a cave-in. Reasons for failure are also described.
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◀ Don't miss . . .

The NYC is constructing the tracks in its new yard at Avon, Ind., from trackage that only a short time before was in main-line service. It's done by removing the track in panels and shipping them directly to the yard site.

. . . in the March issue



FAIRMONT

One machine does six ballast maintenance jobs

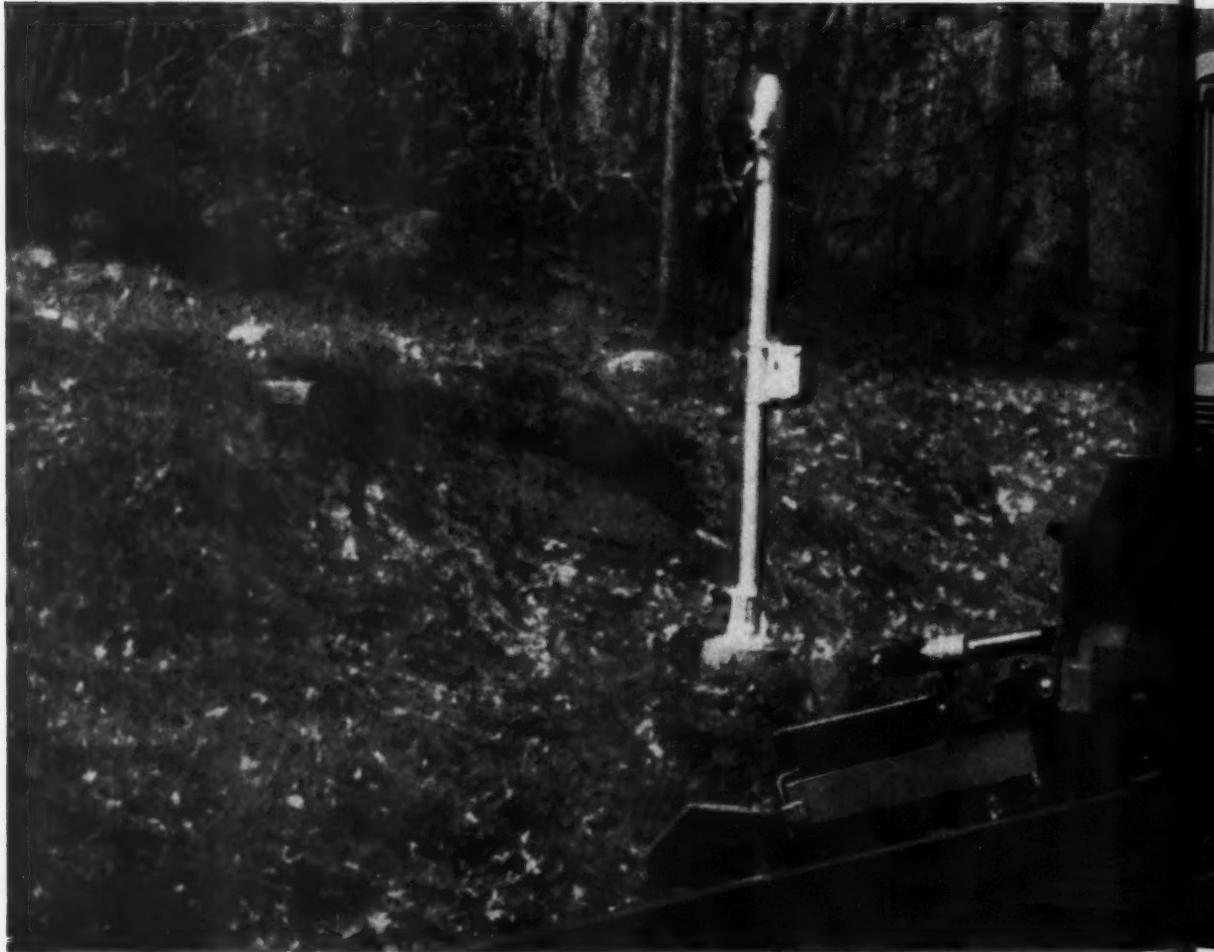
Put one man, and the Fairmont W23 Series A Ballast Maintenance Car, on a ballast drainage or resurfacing job, and you have the equivalent of six different machines working for you.

You have a *center plow* for distributing ballast into or out of the center track area, and for transferring it from one side of the track or the other. You have *ballast equalizing boxes* for shaping or equalizing the shoulders—working alone or as part of a surfacing gang. You have a *scarifier* for digging deep into the shoulders to loosen compacted ballast. You have *discs* for reworking shoulder ballast to remove weeds and improve drainage. You have a *track brush* for

sweeping excess ballast off the ties and filling in the cribs. And you have *ballast bladers* to plow out shoulder ballast.

The Fairmont W23 gets its power from a rugged six-cylinder engine and a torque converter through a four-wheel drive. Tools are hydraulically controlled for accuracy, and the machine is turned by the operator on a built-in hydraulic turntable.

Why not put the Fairmont W23 Series A Ballast Maintenance Cars on your 1960 Budget for delivery in time for spring work? Call a Fairmont representative for full information, or write for Bulletin 72C.





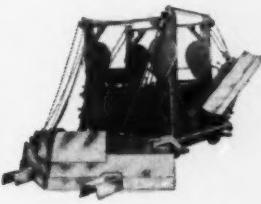
W77 SERIES A BALLAST MAINTENANCE CAR. Three-man operation. Works both sides of the track at one time, keeping ballast in good condition. Pays for itself in two years.



W62 SERIES C BALLAST DISCER. Self-propelled unit for improving track drainage and appearance; reshaping shoulders; and in re-ballasting and tie-renewal programs.



W99 SERIES B SPOT TAMPER. One man hydraulically controls four air tools to raise low spots, hanging ties and low joints, at the rate of 25 to 30 ties an hour.



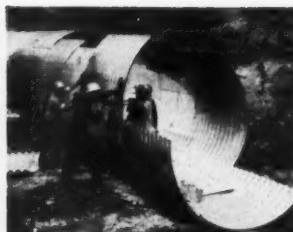
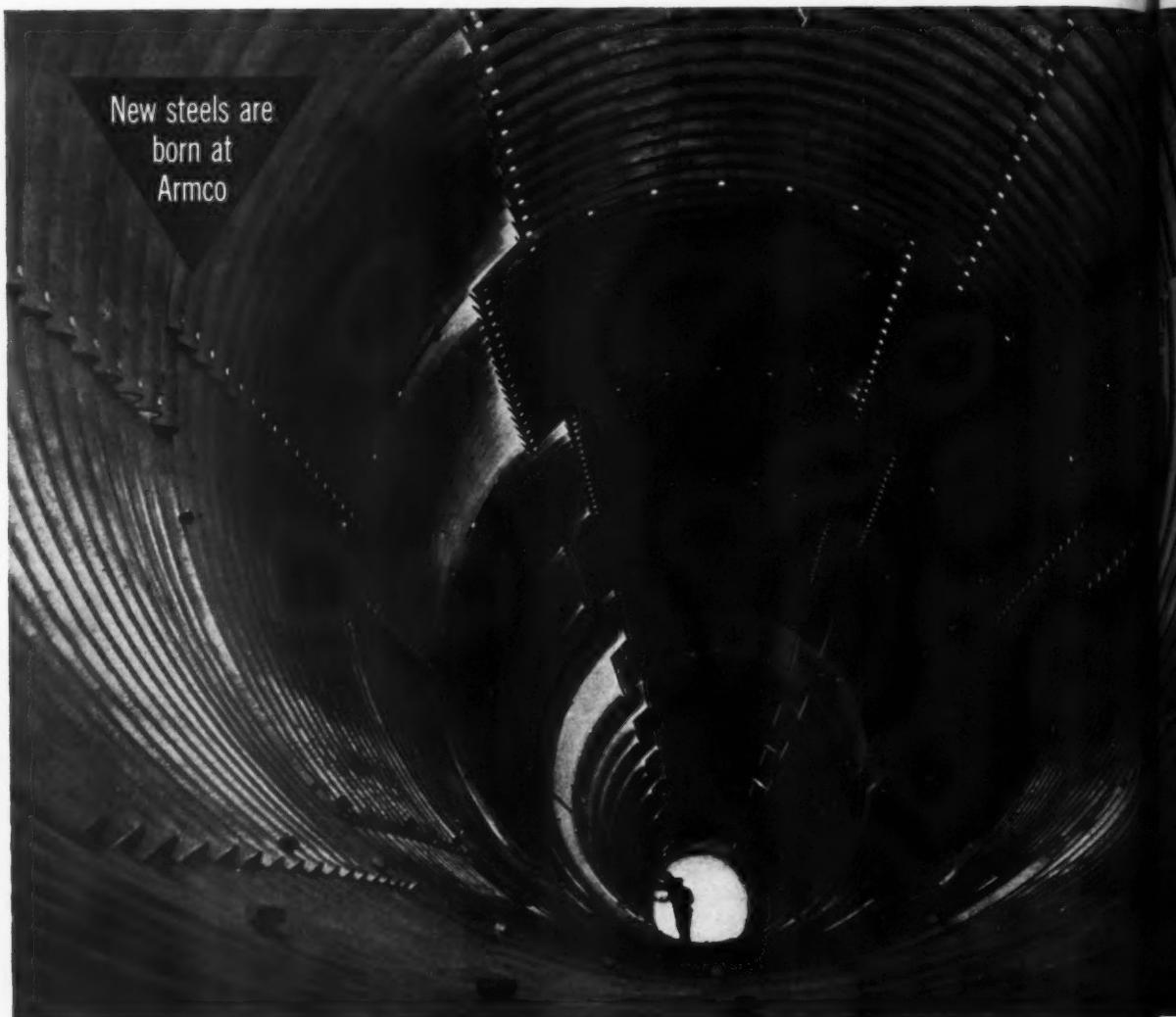
W92 SERIES B BALLAST BLADER AND SHAPER. Spreads and distributes ballast during surfacing and track raising. Economical, one-man operation. Self-propelled.

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4

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2. Easy-to-handle MULTI-PLATE sections are bolted together quickly.
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ASSOCIATION OF AMERICAN RAILROADS—Cleston G. Parris, agronomist on the research staff at Chicago, has resigned, effective January 15, to become assistant manager, Chemicals Department, Tennessee Farmers' Cooperative, at Lavergne, Tenn.

BOSTON & MAINE—John F. Kerwin, engineer of design at Boston, Mass., has been promoted to assistant chief engineer there. Alan E. MacMillan, assistant to chief engineer, also at Boston, has been promoted to construction engineer there, succeeding Francis T. Flynn who has retired after 40 years of service. James J. Healy, assistant division engineer, construction, has been promoted to assistant construction engineer.

CENTRAL OF GEORGIA—James G. Watwood, division engineer at Savannah, Ga., has moved his headquarters to Macon, Ga.

CHESAPEAKE & OHIO—The following changes have occurred recently: Lucien G. Bell, assistant supervisor track at Columbus, Ohio, to supervisor track at Walbridge, Ohio; Herman A. Boehling, Jr., supervisor bridges and buildings at Richmond, Va., to assistant supervisor bridge erection system, at Huntington, W. Va.; E. E. Nichols, Jr., inspector at Huntington, to assistant cost engineer at Raleigh, W. Va.; and J. S. Nelsen to assistant cost engineer at Grand Rapids, Mich.

ERIE—James T. Flynn, assistant division engineer at Marion, Ohio, has been promoted to division engineer at Buffalo, N. Y., succeeding Walton E. Smith who has been transferred to Salamanca, N. Y. Mr. Smith succeeds Louis Rossman, retired.

FRISCO—Oscar Fischer, principal assistant engineer at Springfield, Mo., has been promoted to principal engineer.

L. E. Hobbs, roadmaster, Ft. Smith, Ark., has been promoted to assistant process engineer at Springfield, succeeding H. F. Gliwitz who has been promoted to process engineer there. E. F. Swope, assistant roadmaster at Ft. Scott, Kan., has been promoted to roadmaster at Enid, Okla., succeeding G. P. Chandler who has been transferred to Fayetteville, Ark. M. L. White, roadmaster at Ft. Smith, has been transferred to Hugo, Okla.

ILLINOIS CENTRAL—Issac G. Forbes, assistant engineer of buildings at Chicago, has been promoted to engineer of buildings there, succeeding James B. Schaub who has retired after 42 years of service. A. F. Langmeyer, designer in the office of engineer buildings, has been promoted to assistant general building inspector at Chicago, succeeding J. B. Herboth who has been promoted to general building inspector there. Mr. Herboth succeeds L. S. Marriott who has been promoted to assistant to engineer of buildings, with headquarters also at Chicago.

LOUISIANA & ARKANSAS—Franklin P. Crane, assistant engineer, Shreveport, La.,

has been appointed division engineer there, succeeding William C. Borchert who retired January 1.

MAINE CENTRAL—The following changes have occurred recently at Portland, Me.: Charles G. Rivers, general engineer, to assistant to chief engineer; and James O. Born, engineer of structures, to principal assistant engineer.

MILWAUKEE—Isaac C. Brewer, assistant engineer at Milwaukee, Wis., retired recently after nearly 34 years of service.

NEW YORK CENTRAL—Eugene J. Huelsman, engineer maintenance of way of the Pittsburgh & Lake Erie at Pittsburgh, Pa., has been promoted to engineer-track construction, at Indianapolis, Ind. Leon F. Sepic has been appointed office engineer at Cleveland, Ohio, succeeding William A. Marx, transferred. J. C. Pfaller has been appointed assistant division engineer at Toledo, Ohio. Edward L. Claypole, trainmaster at St. Thomas, Ont., and an engineer by training and experience, has been promoted to transportation superintendent. Charles B. Martin, valuation engineer at New York, has been promoted to chief valuation engineer, succeeding Morton Friedman who has retired after 39 years of service.

NORFOLK & WESTERN—George R. Janosko, assistant engineer maintenance of way of the Virginian at Norfolk, Va., has been appointed assistant manager roadway maintenance of the N&W at Roanoke, Va., following merger of the two roads. Jesse J. Kendrick, Jr., roadmaster at Bluefield, W. Va., has been promoted to assistant superintendent at Roanoke, Va., succeeding Charles G. Hammond, Jr., who has been promoted to superintendent there. B. G. Hudson, assistant supervisor bridges and buildings at Radford, Va., has been promoted to roadmaster and supervisor bridges and buildings at Roanoke, succeeding F. E. Steffey whose retirement was announced in the January issue.

ROCK ISLAND—Robert D. Igou, assistant engineer capital expenditures at Chicago, has been promoted to engineer capital expenditures there, succeeding Edgar H. Pettibon who has retired after nearly 44 years of service. T. J. Burlan, track supervisor at Fairbury, Neb., has been promoted to road-

master at Cedar Rapids, Iowa, succeeding John Carey who has been transferred to Iowa City, Iowa. Mr. Carey succeeds J. C. McConnell who has been promoted to general roadmaster at Des Moines, Iowa, succeeding H. D. Huffman who has been promoted to trainmaster at Rock Island, Ill.

SOUTHERN PACIFIC—J. N. Getlich, senior assistant division engineer at San Francisco, Cal., has been promoted to special assistant to general manager there. John W. Zwick has been appointed water and fuel engineer at San Francisco, succeeding Albert G. Humphries who has retired after almost 35 years of service. Raymond S. Wright, office engineer at Ogden, Utah, has retired recently after 46 years of service.

Earl E. Mayo, vice president of this road's affiliate, Southern Pacific Pipe Lines, Inc., and an engineer by training and experience, has retired after 53 years of service. Mr. Mayo graduated from the University of Oregon in 1909 with a Bachelor of Science degree in civil engineering. He served as chief engineer of the railroad's Pacific Lines from 1944 until he was appointed to his present position in 1955.

WABASH—Frank R. Micheal, engineer way and structures at St. Louis, Mo., has been promoted to assistant chief engineer there.

Obituary

R. C. Smith, roadmaster on the Chicago & North Western at Brookings, S. D., died suddenly on January 2 at the age of 56.

Supply Trade News

BINKS MANUFACTURING COMPANY—James Treese has been promoted to manager of the Railway Sales Division at Chicago, succeeding George Green who has retired after 35 years of service, according to an announcement by Burke B. Roche, president of the company.

A. M. BYERS COMPANY—H. Grady Rogers, Jr., has been appointed field service engineer at Pittsburgh, Pa., according to an announcement by J. A. Cain, manager, Atlantic Division.

DEARBORN CHEMICAL COMPANY—Samuel C. Johnson, vice president in charge of the company's railroad department, has been appointed vice president in charge of transportation relations, according to an announcement by William F. Johnson, general sales manager. In this position, Samuel Johnson will co-ordinate and implement the expansion of the railroad department to provide servicing for the entire transportation industry. The announcement stated that the expansion is in line.

(Continued on page 56)



Charles G. Rivers
Me C



James O. Born
Me C

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with ready-to-use, easy-to-apply

EFFECTIVE...ECONOMICAL
UREABOR
WEED and GRASS KILLER



Here's your thrifter, easier way to stop weeds! Look in that hand and you'll see enough UREABOR to kill vegetation in a 12 sq. ft. area! Consider the convenience and economy this can mean to you.

Consider, too, that a UREABOR "kill" remains effective for a season or longer. And UREABOR has important safety features; it is *nonflammable, nonpoisonous* when used as directed, and *does not corrode ferrous metals*. Protect your timber structures, yards and buildings from fire-hazardous weeds by applying UREABOR weed killer now...it's easier to apply!



Nothing to mix...no water to haul
One easy application—dry—may keep ground weed-free for a season or longer!

This special spreader for UREABOR makes application fast and easy...

The PCB Spreader applies UREABOR to best advantage, at prescribed low rates. It holds enough UREABOR to treat up to 2500 sq. ft. without refilling—weighs a mere 6 lbs.



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Changes in Supervision

Recently we were given the opportunity of examining a chart showing the chain of supervision of a road which recently revamped its engineering, track and B&B forces. A comparison of it with one of five years ago revealed some interesting developments.

This railroad, with slightly less than 1,000 miles of track, was operated as four divisions five years ago—now as two. Five years ago the department supervisory staff, excluding draftsmen, instrumentmen and rodmen, totaled 29 men, divided between 9 at headquarters and 20 in the field. Today, this force again totals 29 men but is divided 13 at headquarters and 16 in the field.

This represents an increase of four on the headquarter's staff and a loss of four in the field force. The headquarters' staff was enhanced by an engineer of maintenance, an assistant engineer of maintenance and two assistant engineers.

Looking at the field forces we note that the positions of division engineer, assistant division engineer, B&B master and roadmaster have been abolished. But, other positions have been created which reflect the trends of the times.

An assistant supervisor of work equipment has been created. This, no doubt, is necessitated by the increased number of machines which the road has acquired.

Also, the number of track supervisors has been increased from four to six and an assistant track supervisor has been added. While the number of men engaged in B&B work remains the same, the job designations and duties have been changed.

A study of these changes indicates that this road has brought all its higher or policy-setting supervision under one roof and has placed more field supervision at the working level.

Progress in solving local labor problems

Negotiations are now under way on a national basis between bargaining teams representing the railroad unions on the one hand and railroad management on the other. The issues are wages, fringe benefits and working rules. Right now these negotiations are proceeding quietly and without fanfare. Sooner or later, however, they will come to a head, either in the form of an agreement or a breakdown, and then they will be front-page news for the daily press all over the country.

At the same time another type of negotiations is going on between the railroads and union representatives. This type seldom, if ever, gets into the newspapers. Yet, in its overall effect on the railroads and their employees, it is no less important than the national negotiations. We refer to the bargaining that goes on more or less constantly on all railroads at the local level.

For the maintenance-of-way department this bargaining is conducted for the most part by local M/W officers and the general chairman of the Brotherhood of Maintenance of Way Employes. The issues dealt with—interpretation of agreements, grievances, seniority matters and the like—are of only local significance but the aggregate effect of the results on the railroads and their employees must certainly approach that of the broad issues dealt with at the national level.

Local bargaining is particularly important at the present time because of the reorganization and regrouping of the maintenance forces that is required by the trend to mechanization and cycle maintenance. Severe restriction of maintenance funds on most roads requires that such changes be made if costs are to be kept in line with allotments. But difficulties ensue when the proposed changes run afoul of agreements with the union.

Then comes the bargaining. But this type of bargaining differs in several important respects from that carried on at the national level. For one thing the latter is in the public eye with the result that the negotiators are reluctant to make compromises because of the fear they will be interpreted as defeats in the press. This fear is not present to the same extent in local negotiations.

Another consideration is that, while national negotiations are apt to be conducted in a formal atmosphere between relative strangers, those at the local level are usually of the "shirt sleeve" variety conducted between persons whose relationship is very likely on a first-name basis. Such an atmosphere, it would seem, should be conducive to a give-and-take attitude on both sides.

Aided by these factors, the railroad and union officers endeavoring to work out agreements on local issues are in a position to exercise the degree of statesmanship needed to arrive at solutions that are fair and reasonable from both points of view. On some railroads the outcome has been in line with this expectation. On others it has not. In the latter instances a little soul-searching on the part of both parties might point the way to greater progress.

NORDBERG PRESENTS THE NEW "MIDGET" SURFACER

(Above): New Nordberg "Midget" Surfacer in use, with the 4-wheel carriage and the three 2-wheel buggies connected by coupling tubes, around which the wire is stretched. (Below): Carriage on a curve and pointers on "zero". Note hand jacks on platforms and one of the two retaining brakes being used to hold the "Midget" on a grade.



The new Nordberg "Midget" Surfacer eliminates human error and guesswork by utilizing a 50-ft. length of tautly drawn wire over each rail to locate and correct low spots in track surface. It is made up of a 4-wheel carriage and three 2-wheel buggies. Two pointers are employed, one for each rail. One end of each pointer is in constant contact with its wire, and the other end moves over a graduated scale which is mounted on the carriage over the center of the track.

As the lightweight "Midget" is pushed along the track, the two pointers are observed. If the surface

WIRE REPLACES HUMAN JUDGMENT AND ELIMINATES VISUAL ERRORS

... here's what the "Midget" Surfacer does:

- Smoothin' . . . locates and corrects irregular surface.
- Locates and corrects minor surface irregularities after jacking and before tamping in a track raising operation.
- Locates and corrects settlement irregularities following ballasting of high lifts.
- Analyzes the quality of track surface.

is perfect, these pointers will constantly indicate "zero" on the pointer scale. As low spots are encountered in either rail, the individual pointer will move below "zero". In this way, each rail is analyzed independently of the other.

When a low spot is found, the "Midget" is moved back and forth to locate the lowest point, and a hand jack is then inserted at this spot and used to lift the track until the pointer reading is corrected. A tie adjacent to the hand jack is tamped manually to hold this correction. Suitable tamping means are then employed to tamp all ties at the corrected spot.

Write for complete information.



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Mechanical Muscles®



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the
track
for
the
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Company _____
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City _____ State _____



ORIGINATORS OF DDT INSECTICIDES

. . . a résumé of current events throughout the railroad world

Negotiations with the non-ops were resumed in Chicago at a four-day meeting beginning January 19. Talks involved wages and fringe benefits and were still in the preliminary stages. The unions had served notice on September 1, 1959, that they wanted a 25-cent an hour increase in wages and a 7-cent per hour increase in health and welfare benefits. This is in addition to the increases brought about by the cost-of-living index, which on November 1 aggregated 15 cents per hour. Management had asked unions to accept a reduction of 15 cents an hour.

Caboose and camp-car manufacturing facilities of Morrison International Corporation were acquired by Ryder System, Inc., a holding company which operates both a common-carrier trucking system in several southern states and a truck-leasing firm in the South, Southwest and West. Another Morrison asset Ryder is acquiring is its leasing affiliate, Morrison Plan, Inc.

No major transport legislation is called for at this session of Congress, in the opinion of Senator Smathers of Florida, who sponsored the 1958 Transportation Act. Recent legislation "is adequate for present needs in the industry and to protect the public's welfare," the senator said. An exception will be the senator's attempt to complete repeal of the tax on fares which Congress has already cut from 10 to 5 per cent. He says the revenue involved is not sufficient to justify continuance of the tax which "discourages the use of common carriers for passenger travel to the detriment of the industry and the nation's passenger transportation network."

Within 10 or 20 years, "trains running on unsignaled plastic rails at speeds we can only dream of now, controlled by huge electronic brains," will not surprise C&O's Vice-President Owen Clarke. Speaking at the Huntington (W. Va.) Engineers Club, Mr. Clarke continued: "I certainly would anticipate that classification yards will be made so automatic that electronic controls will handle practically the entire job of re-assembling incoming cars into outbound trains."

A 9.4 percent increase in gross capital expenditures in the first quarter of 1960 by 105 Class I railroads over the same period last year is predicted by the ICC. Expenditures for equipment will be about 1.0 per cent above the 1959 period and expenditures for road property will be up about 28.3 per cent

A 38 per cent gain in rail renewals and a 21 per cent increase in tie renewals are predicted for the Class I roads in 1960 compared with 1959. The prediction, made by Railway Age, was based on information received from most Class I roads. The forecast is that about 675,000 net tons of new rail and 19.7 million tie insertions will be made this year, compared with 492,000 net tons of new rail and 16.0 million tie insertions in 1959.



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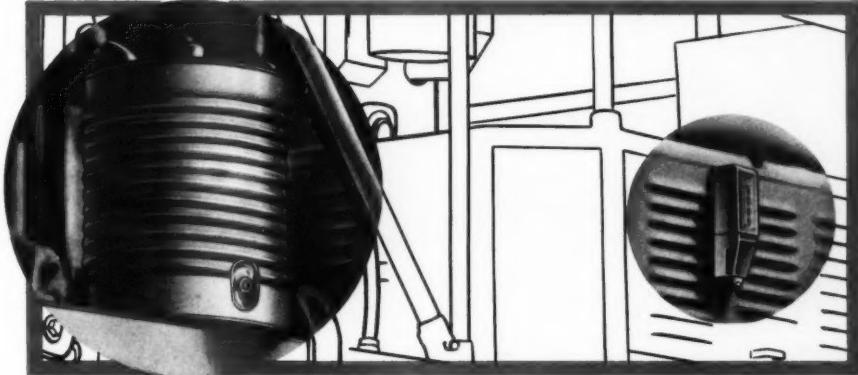




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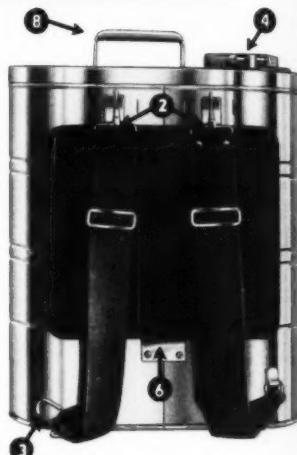
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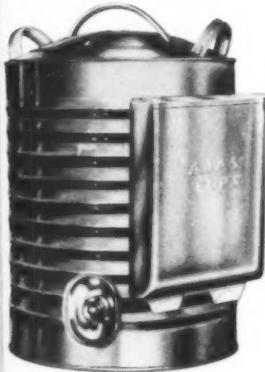
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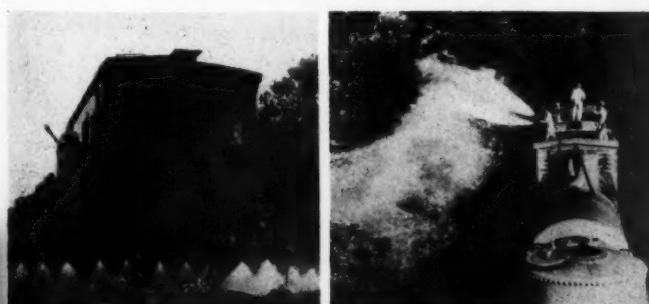
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How to check the growth of brush on a million acres of land? That's the problem facing maintenance officers today. It's equivalent to clearing a tangled wilderness larger than the state of Rhode Island. To do the job two principal means are being used—powered machines, ranging from one-man saws to bulldozers, and herbicidal chemicals.

It's a growing problem

● Do you have a brush problem on your road?

If so, you've got plenty of company. On the basis of a survey made by *Railway Track and Structures* it's estimated there are about 80,000 miles of right of way in the United States on which the presence of brush constitutes a problem.

If the average right-of-way width is assumed to be 100 ft, the total brush-ridden area figures out to be nearly a million acres. Which means

the railroads are confronted with the problem of how to check the growth of brush over an area larger than the state of Rhode Island.

Brush—meaning any kind of woody growth—is something the maintenance forces have always had to contend with. Practically since the first railroad was built it has been almost a tradition for the section forces to devote considerable time in the winter to brush-cutting activities. In this way most railroads were able to exercise a

reasonable degree of control over the growth of brush.

But conditions have changed.

The track forces in general, and the section forces in particular, have been trimmed down as the need for economy has forced the railroads to regroup their manpower into mechanized gangs. Under these new conditions brush-cutting work was naturally greatly restricted. The inevitable result was that brush got out of hand on many branch and secondary lines, and even on some main-line districts.

One maintenance man with thousands of miles of brush to worry about

What's being done about it →

The battle against brush

recalls that his troubles from this source date from the time, ten years ago, when section gangs were discontinued. "When saplings will grow to a height of 8 to 10 ft the first year, and are allowed to grow over a period of years, it isn't long," he says, "before you've got a real problem on your hands."

It isn't that he is critical of the decision to cut the track forces. He is merely saying the brush problem is a by-product of the cost-cutting activities that have been necessary on every road.

The point is that today brush is threatening literally to take over thousands of miles of railroad right of way. In some places the brush is confined to scattered clumps. At the other extreme are locations where it grows densely from the right-of-way fence to the track shoulder. Trains on some secondary lines literally move through a tunnel formed by brush and trees that come together in an arch over the track.

Railroad management in general has long regarded brush control as something of a luxury. When retrenchment became necessary brush-control operations were the first to feel the effects of the axe on many lines. But when the growth of brush gets out of hand management can't help but be impressed by the costly results when it fouls communication lines, or by the safety hazard presented when brush obstructs vision on the inside of curves or at grade crossings. Management is also cognizant of the fact that brush growing too close to the track interferes with the movements of both trainmen and trackmen, and is a general hindrance to proper maintenance of the track and roadbed.

Maintenance men, therefore, may get more money in the future for fighting brush, but they will have to make it go as far as possible. To this end they are turning to power-driven brush-cutting machinery and herbicidal chemicals, as described in the following articles.

Many types of powered cutters

Hand methods of cutting brush are giving way to mechanized equipment, including one-man portable saws and tractor-drawn or tractor-mounted cutters.

● Methods of cutting brush on railroad rights of way today contrast strongly with those that predominated only a few years ago.

It's true that brush is still frequently cut with brush hooks, axes and other hand tools. Some roads still follow the traditional practice of having their section forces spend considerable time in the winter cutting brush with such tools.

But the trend today is toward the use of power-driven tools and machines for such work. Perhaps this trend started when a track supervisor first borrowed a chain saw from the B&B department for cutting brush. Or perhaps it had its inception when a bulldozer was first put to work leveling brush that was threatening to foul a communication line.

Chain saws and bulldozers are still used for this purpose. But now they are supplemented by power tools and equipment specially designed for cutting brush.

There are, for example, several types of portable, one-man saws available, which have come into rather wide use on the railroads. These are generally self-contained, gasoline-engine-driven units with the power plant

carried by the operator with the aid of shoulder straps. The cutting tool is usually a circular saw mounted at the end of an arm of such length that the saw can be wielded by the operator from a standing position. Experience of one road is that two men with saws of this type can cut about an acre of brush a day.

Various types of tractor-drawn or tractor-mounted brush-cutting units are also available and are coming into use on the railroads. Manufacturers of these devices claim they are capable of cutting brush and trees up to 4 and 5 in. in diameter.

One road is using a brush-cutting attachment mounted on a crawler tractor equipped with track shoes so that it may be operated on the rails as well as on the ground. It has a sickle-type cutting bar mounted at the end of an adjustable arm that may be extended a distance of about 18 ft from the center line of the track.

One top maintenance man with 4000 miles of line on which brush is a problem is looking for an on-track, off-track brush cutter with a cutting arm on each side. As he visualizes it the arms could be adjusted up and down as desired and would cut brush



DEMONSTRATION of an International Harvester heavy-duty rotary mower mounted on an F-460 tractor. Brush is shredded by heavy whirling blades center-mounted under tractor. In demonstration saplings up to 4 in. thick were said to be bowed over by tractor.

are in use

out to a distance of about 8 ft from the rail. For cutting beyond that point the machine would operate as an off-track unit.

When brush is cut shoots usually sprout quickly from the stumps. To prevent this from happening, and to effect a complete kill of the plants, an increasing number of roads are spraying the stumps of newly cut brush with a herbicide. The chemical, it is emphasized, should be applied to the stem or bark of the plant rather than the cut surface. Experts also emphasize that the chemical should be applied soon after the plants have been cut. If proper application of the chemical is made experience is that the stump will rot and disintegrate within two years or less, depending on the species of wood involved.

Application of chemical to newly cut stumps may be made by a man carrying a tank of the chemical on his back and using a nozzle several feet long to direct the stream. More elaborate equipment may be used if a large-scale brush-cutting operation is involved. For use next year in its out-of-face brush-cutting operations one road plans to equip a push car with a chemical storage tank, a pump and several hose lines.

The more common use of chemical herbicides is to apply them to the plant in its natural state. This method of controlling brush is described in the following article.



MECO-SOUTHWORTH brush cutter is shown in operation here. It is said to be capable of cutting trees up to 8 in thick by notching. Has a 10-in saw blade. Man at right is carrying chemical tank and nozzle for spraying stumps.



HALL-HOLMES brush cutter mounted on a Caterpillar tractor equipped to operate on the rails. Cutting arm, with sickle bar at outer end, is jointed and adjustable to permit cutting at various levels and distances from the track.



ROWCO BRUSHKING has saw blade 10 in. in diameter, and is powered by high-speed, two-cycle, air cooled engine. Attachment is available for trimming heavy weeds and grass.



COVINGTON CUTTER is claimed by manufacturer to cut trees up to 4 in. thick. Cutting is done by 10-lb "underserrated" blades swinging freely on bushings that are said to take all the wear.

The battle against brush

By Cleston G. Parris *

● A new phase of brush control came into existence with the introduction of hormone-type brush killers in 1945. This was the discovery of the herbicidal activity of the growth-regulating compounds, 2, 4-D and 2, 4, 5-T.

These hormone-type herbicides affect the growth processes of certain plants. On those they affect, they are absorbed by the plant tissue and are translocated within the circulatory system of the plant. The activity of such compounds appears to be greatest during early spring and late fall at which time large amounts of plant food are being transported toward the roots. Today millions of pounds of these materials are produced annually and nearly all the 2, 4, 5-T goes on woody plants.

What are the methods and techniques used for the chemical control of brush? There are three basic types of treatment used. These are foliage, stem and root, with modifications such as basal, stump and frill. Of these, foliage-type treatments have been more extensively used by railroads than the others.

Foliage treatment—A foliage spray is applied during the time deciduous plants are in leaf. It is important to correlate the time of spraying with the natural movement of plant food, as well as with moisture conditions and growth factors which produce healthy vigorous foliage. It is generally agreed that, with species that go somewhat dormant in the hot part of the summer, translocated materials should be applied during early spring at the time of full leaf development or

*At the time he prepared this article Mr. Parris was serving as agronomist on the AAR research staff, Chicago. Effective January 15 he resigned to accept the position of assistant manager, Chemicals Department, Tennessee Farmers' Cooperative, Lavergne, Tenn.

Chemicals prove powerful ally

Woody plants can be destroyed by formulations of 2, 4-D, 2, 4, 5-T and ammonium sulfamate. But many questions are involved in their use. How much? When? How often? These are just a few of them. This article, written exclusively for **Railway Track & Structures** by an authority on the subject, contains answers to many of the questions.

during late fall when a second peak of plant activity has been reached.

Treatment is possible throughout the summer with warm-season plants that continue rapid growth and rapid translocation. Many spray until two weeks before frost. It is difficult for railroads to take full advantage of these factors because of the great number of species involved and the thousands of miles of line which must be sprayed.

Foliage applications are usually made on railroads with on-track equipment due to the speed of application and economy of such a treatment. However, a limited amount of work has been done using off-track equipment. A complete coverage of foliage, especially underneath the leaves, and stem is often possible with such equipment. Results with off-track equipment have been superior to that with on-track equipment but cost of such treatments are more expensive. Whether the increase in effectiveness justifies added expense in such an operation must be determined by the individual railroad.

Foliage sprays have been applied experimentally on railroads with a helicopter. These treatments require low-volume applications and have oil, oil-water emulsion or water as the carrier. A ratio of 1:4 oil and water is considered best because the droplet size is larger than when oil is used, thus minimizing the drift hazard. Such applications may have a place in treating areas in rough terrain or where inaccessible with on-track equipment.

Materials commonly used as foliage sprays are 2, 4-D and 2, 4, 5-T formulations and ammonium sulfamates. In recent years, railroads have used considerable amounts of low volatile ester and amine formulations of 2, 4-D and 2, 4, 5-T as foliage applications. The ester formulations have

been more extensively used than the amine forms; however, the amine salts appear to be coming into increasing use.

The ester formulations of 2, 4-D and 2, 4, 5-T can be mixed with oil and water. Their ability to mix with oil makes them effective when applied to the leaves of plants having oily or waxy surfaces. All esters are volatile to a certain degree but the low-volatile esters are safer to use where volatility might be a factor in causing damage to crops such as cotton, tobacco, tomatoes, legumes and vegetables, as well as fruit trees, grapes, shade trees, flowers and ornamental shrubs.

The amine salts of 2, 4-D and 2, 4, 5-T are non-volatile and may be used with a greater degree of safety in areas adjacent to crops. The effectiveness and cost of the amine salts compare favorably with the ester formulations. The amine salts may not be as well absorbed through waxy leaf surfaces; however, they are more easily translocated once they reach the circulatory system of the plant. The amines are soluble in water in all proportions and are well adapted to low-gallonage spray equipment.

The strength of solution of the 2, 4-D and 2, 4, 5-T materials is generally 4 lb acid equivalent per 100 gal water, but may vary from 3 lb to 6 lb. In some areas 10 to 15 gal of oil has been added to each 100 gal of spray solution. This type of mixture

ALL THREE of these views show brush thd.



appears to increase the effectiveness of the chemicals on some of the deciduous species and conifers.

Ammonium sulfamate (AMM) has been used extensively on railroads in areas adjacent to crops or in states where the use of hormone-type brush killers have been restricted. It is non-volatile and can be used with relative safety in the vicinity of valuable plants. Ammonium sulfamate is water soluble and it provides a contact action as well as being translocated when it is absorbed into the circulatory system of the plant.

Larger quantities of spray solution of this material are usually applied per acre than with the hormone types of brush killers. When ammonium sulfamate is used, from 60 to 80 lb of crystals should be mixed with 100 gal of water, plus 4 oz of spreader-sticker as recommended by the manufacturer. If the ammonium sulfamate solution is used the dilution should be 10.7 gal per 100 gal water.

Woody species show varying degrees of susceptibility to 2, 4-D, 2, 4, 5-T and ammonium sulfamate (AMM). Table 1 is a list of species showing their susceptibility to these materials when treated as a foliage spray. It should be noted that the opinion of any group of users regarding the reaction of a particular species to a certain application of chemicals is seldom unanimous. Therefore, this table should be regarded as representing the opinions of many users for each species.

Root-sprouting species, such as ash, sassafras, persimmon, sumac, locust and poplar, constitute the major problem with foliage sprays. These may not be hard to kill when young, but may require repeated applications when they have developed an extensive root system.

Basal-stem treatment—Basal-stem applications are seldom used on railroads because of the high cost of such treatments. These treatments are effective during either the dormant or

growing season but require oil as a carrier and higher amounts of chemical. Species, such as ash, persimmon, red maple, red bud, hickory, basswood and some oaks, that are difficult to kill with foliage treatments appear to be more susceptible to basal-stem applications. A summer basal-stem treatment has given control of the root-suckering species such as sassafras and aspen.

Off-track equipment is necessary in applying basal-stem applications. Solutions of a low-volatile ester of 2,4,5-T or a combination of 2,4-D and 2,4,5-T in oil should be used for such applications. Rates should be from 8 to 16 lb per 100 gal of oil. These solutions should be sprayed on the lower two feet of the stem, thoroughly wetting it to the ground line and root crown. The bark of the tree or brush should be reasonably dry so as to absorb more of the spray solution.

Stump treatment—Stump spraying is ordinarily done with the same type of equipment used for basal-stem spraying. It is generally recommended that stumps be sprayed soon after trees are cut. The same concentration of solution should be used as for basal-stem spraying. In making the application care should be taken to spray the entire circumference, beginning at the base and thoroughly wetting the bark including the cut surface of the bark. Also any exposed roots should be sprayed.

Frill treatment—The frill method is used to control large woody plants but is seldom used on railroads. Frilling is done by cutting a continuous ring through the cambium and around the trunk without breaking out the chips. The frill should be made as close to the ground as possible for best results. Chemical is then applied in the frill. Materials commonly used are 2,4-D, 2,4,5-T amine and esters, in oil or water, and AMM applied dry or in water solutions.

New methods and chemicals—There has been considerable interest among

Table 1 — Reaction of deciduous woody plants to foliage spraying†

Plant species	2,4-D and 2,4,5-T*	2,4,5-T*	Ammate**
Ailanthus	M	M	M
Alder	S	S	S
Arrowwood	S	M	M
Ash	R	M	R
Basswood	R	R	R
Beech	M	S	S
Birch	S	S	S
Blackberry	S	M	M
Blueberry	S	M	M
Buckeye	M	M	M
Buckbrush	S	M	S
Catalpa	S	S	S
Cherry	S	M	M
Cucumber tree	M	M	M
Dogwood	M	M	M
Elderberry	S	M	M
Elm	S	M	M
Grape, wild	S	S	S
Greenbrier	R	M	M
Gum, red or sweet	S	M	M
Gum, black	M	M	M
Hackberry	M	M	M
Haw	M	M	M
Hawthorn	M	M	M
Hercules club	S	S	S
Hazel	S	M	M
Hickory	M	M	M
Honeylocust	M	S	M
Honeysuckle	M	M	M
Ironwood	S	R	S
Laurel	R	R	R
Locust	S	S	M
Maple, sugar	R	M	M
Maple, red	R	M	M
Oak	M	M	M
Osage orange	S	S	M
Pawpaw	M	M	S
Persimmon	R	M	M
Poplar	S	S	S
Poison ivy	M	S	S
Redbud	M	M	M
Sassafras	S	M	M
Spice bush	S	S	M
Sycamore	S	M	M
Tulip tree	S	S	M
Walnut	S	S	S
Willow	S	S	S
Witch hazel	S	S	S

†Compiled by the Rural Electrification Administration, United States Department of Agriculture, and published in REA Bulletin 161-17 (Electric); 441-2 (Telephone), "Brush control practices for R/W maintenance," April 1959.

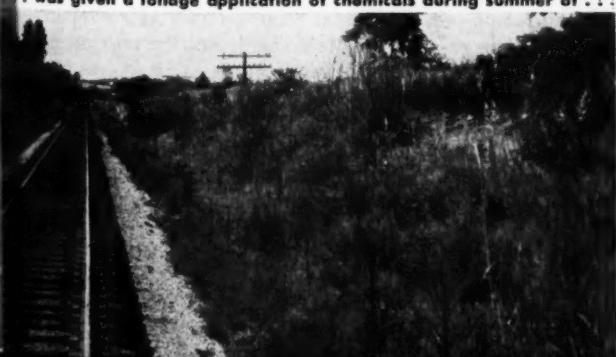
S—susceptible, M—moderately resistant, R—resistant.

*Concentration, 4 lb acid equivalent per 100 gal of water.

**Concentration, 75 to 100 lb Ammate per 100 gal of water.

... was given a foliage application of chemicals during summer of ...

... 1958. All photos were taken during summer or fall of 1959.



The battle against brush

railroads in the use of granular or pelletized materials for controlling brush. It is expected that these will have a definite place in a brush-control program. To date, most of the work has been primarily experimental*; however, at least one pelletized material is presently commercially available and is registered for use east of the Rocky Mountains. This material is sold under the trade-name Dybar and contains 25 per cent active ingredient of fenuron (3 phenyl-1, 1-dimethyl urea). Rates of 50 to 75 lb of commercial product are recommended per acre.

Results based on limited observations indicate that dry materials containing fenuron and TBA (trichlorobenzoic acid) are effective in controlling lateral root-sprouting species such as sumac, locust, sassafras and persimmon. These species are normally quite resistant to foliage-type application and further observations of tests seem to be justified. Soil types appear to influence the results obtained from the use of root absorbed materials. These materials are more effective and quicker reacting on sandy soil than on clay soil. This may be explained by the fact that a higher concentration of chemical is carried into the root zone more readily in sandy soils.

Method of application is one of the problems encountered in the use of granular or pelletized materials. Various methods have been employed in applying these materials on a test basis. These have been applied by air gun, by cyclone seeder, by hand broadcast, by tablespoon (one or two for each stem) and from the air.

The air-gun method appears to be quite promising in applying dry materials. This type of application is rapid, requires little personnel, does not require a spray train, provides good distribution and is easy to calibrate.

*Many railroad test plots involving the use of such materials were inspected in 1959 by the AAR research staff. The results are described fully in the AREA Bulletin for February, 1960.

A cyclone seeder can be used effectively in applying these materials, especially as a spot treatment. The results obtained from the tablespoon method have been outstanding, but considerable time is involved in comparison to broadcast foliage applications.

The use of a helicopter may have a place in future applications of dry materials on railroads. Its use has been demonstrated in test work and the results are now under evaluation.

Another problem is the danger of injuring trees adjacent to the right of way. Caution should be taken in applying root-absorbed chemicals in areas where danger of injury may result from such an application.

Cane broadcast treatment—This type of treatment is similar to a foliage application except that it is applied directly to the stem of the plant after about November 1 and until mid-March. It has not been used by railroads as a general practice; however, a test section was established on one railroad during March 1959 using on-track equipment. A low volatile ester of 2,4,5-T (Technical T—containing 6 lb acid equivalent per gal) was mixed with diesel fuel at the rate of 1 gal 2,4,5-T to 100 gal diesel fuel. Rate of solution used per acre was approximately 150 gal. This treatment was applied during March prior to the leafing out or budding stage. The stems of the brush received a good coverage with a high concentration directed at the base of the plants.

Results at the end of the 1959 season were very good and these justify further evaluation of this type of treatment. Additional tests were applied during November 1959 and January 1960. There are two major advantages to cane broadcast treatment. They are: (1) The length of the spraying season for brush is extended; and (2) this treatment may be used in areas where crop damage is a problem with foliage application.

Invert emulsions

The problem of spray drift has restricted the use of the hormone-type brush killers in some areas. The recent development of invert emulsion with 2,4,5-T has aided in minimizing the drift problem. In this type of emulsion, water droplets are dispersed through a continuous system of oil, giving a water-in-oil emulsion. Most

of the work with invert emulsions has been done on utility rights of way, but these may have a place on railroads. Results with these materials have been comparable to the conventional emulsions.

Application appears to be one of the major problems with the invert emulsions due to their mayonnaise-like consistency. These materials have been applied successfully by the use of helicopter on utility rights of way equipped with conventional nozzles as well as the centrifugal force or rotary brush applicator.

Other materials that show promise in controlling brush are silvex [2-(2,4,5-trichlorophenoxy) propionic acid], amitrol (3-amino-1, 2,4-triazole) and 2,3,6-TBA (2,3,6-trichlorobenzoic acid).

What about the cost?

The cost of chemical control of brush may range from \$15 to \$80 per acre. Cost depends upon the type of application, the chemical and the rate of application, and the height and density of the brush. Table 2 contains a list of materials used for controlling brush during 1959. This table includes information on chemical composition, recommended rate per acre, dilution, cost per pound or gallon f.o.b. plant, and cost per acre. The cost of any specific material is normal within this range, but it is subject to adjustment by commercial applicators as well as manufacturers. Additional chemicals were available during 1959 but their prices were not available.

There are a number of methods available for controlling brush, each of which can be used to advantage under certain conditions. It is important that a well-planned long-term systematic program be followed in order to obtain the greatest benefits. Whether a program is mechanical, chemical or a combination of both, the objective is to control brush as economically as possible.

This cannot be overlooked because the funds available often dictate the type of program that is followed. An additional year or two years' plant growth often increases the cost of an application as much as 50 to 100 per cent. Knowledge of the conditions that exist will enable the person responsible for brush control to plan a program that will give the greatest return for each dollar spent.

Table 2—Cost of chemicals used for brush control on railroads during 1959 (FOB plant)†

Chemical	Composition	Rec. rate per acre	Conc. chemical: water	Cost per lb or gal	Cost per acre
"Ammate" X Weed and Brush Killer	Ammonium sulfamate 95%	179-269 lb	60 lb: 100 gal water + 4 oz spreader-sticker 10.7 gal: 100 gal	\$0.272 in 300 to 2,000 lb quantities \$0.86 gal +	\$48.68-73.17
Ammate Weed and Brush Killer Solution	Contains 5.6 lb "Ammate" X per gal	32-48 gal			\$27.52-41.28
Brush Killer 22	Iso-octyl ester of the 2, 4-dichlorophenoxyacetic acid 33.7%, iso-octyl ester of the 2,4,5-trichlorophenoxyacetic acid 32.1%, inert ingredient 34.2%, total ingredient 100%	1.65-2 gal	1:113-1:150		\$14.00-20.00
Esteron 245 O.S.	Propylene glycol butyl ether 2,4,5-trichlorophenoxyacetic acid 4 lb acid equiv: gal	2-3 gal conc	1:100-1:125	\$7.95	\$15.90-23.85
Esteron Brush Killer O.S.	Propylene glycol butyl ether ester-2,4-dichlorophenoxyacetic acid, 2 lb acid equiv: gal, and propylene glycol butyl ether ester-2,4,5-trichlorophenoxyacetic acid, 2 lb acid equiv: gal	2-3 gal conc	1:100-1:125	\$5.82-6.30	\$11.64-18.90
Fenuron ("Dybar" Fenuron Weed, Brush Killer Pellets ¹)	Fenuron (3-phenyl-1,1-dimethylurea 25% active ingredient)	50-75 lb	applied as formulated	\$1.05: lb *	\$52.50-78.75
Kuron	Low volatile propylene glycol butyl ether ester, 2-(2,4,5-trichlorophenoxy) propionic acid, 4 lb acid equiv/gal	1-1½ gal conc	1 to 1½:100	\$8.51	\$8.51-12.77
Line Rider LV-6T-O.S. ²	(Low volatile) 2-ethyl hexyl esters of 2,4,5-trichlorophenoxyacetic acid, 6 lb acid equiv per gal	up to 2 gal conc (maximum conc broadcast)	1:100 diesel oil or No. 2 oil	\$10.71 55 gal drums	\$21.42 + oil
Low Volatile Brush Killer	Acid equiv 4 lb: gal	<i>Foliage spray</i> 1 gal to 100 to 150 gal water. Add .1% by wt. wetting agent	<i>Foliage spray</i> 1:100-1:150	\$6.63 LCL	\$13.26-19.89
Low Volatile ester 2,4,5-T Standard Brush Killer	Acid equiv 4 lb: gal	<i>Basal dormant or stump</i> 1 gal in 24 gal diesel oil	<i>Basal dormant or stump</i> 1:24 oil	\$8.60 LTL	\$17.20-25.80
Trysben 200 ³ Weed Killer + ⁴	Iso-octyl esters of 2,4-D and 2,4,5-T 66.6%, equal to 2 lb: gal of 2,4-dichlorophenoxyacetic acid and 2 lb: gal 2,4,5-trichlorophenoxyacetic acid	2-3 gal conc	1:100-1:125	\$7.02: gal	\$14.04-21.06
Veon Brush Killer	Dimethylamine salt of trichlorobenzoic acid 24.8%. Dimethylamine salt of other polychlorobenzoic acid 1.3%. Total active ingredients 26.1%	2-6 gal	2 gal: 100	\$10.00: gal	\$20.00-60.00
Veon 245	Amine formulation 2,4-dichlorophenoxyacetic acid, 2 lb acid equiv: gal conc, 2,4,5-trichlorophenoxyacetic acid, 2 lb acid equiv: gal	2-3 gal conc	1:100-1:125	\$5.82-6.30 Note: Price not developed but is in this range	\$11.64-18.90
	Amine salt formulation 2,4,5-trichlorophenoxyacetic acid, 4 lb acid equiv: gal	2-3 gal conc	1:100-1:125	\$7.95-8.113	\$15.90-24.34

† As published in AREA Bulletin, February 1960.

* FOB nearest stockpoint.

* Truckload or carload quantities.

¹ Registered for use in all areas east of the Rocky Mountains.

² Volume required for cane broadcast depends on density of vegetation. Recommended rate based on 200 gal (maximum volume) solution per acre using off-track equipment.

³ Recommended only for controlling conifers, sumac and hackberry at the present.

The B&O has developed a short cut for taking up second main track no longer needed because of the installation of CTC. Basis of the method is a specially designed ripper which, when towed by a work train, quickly separates the rails from the ties. It also makes other operations easier.



ADVANCE WORK includes the removal of half the bolts and all of the rail anchors.

● How to take up long sections of track with speed and economy? That was the question facing B&O engineers as the result of extensive installations of CTC.

The thought of taking up the track piece by piece, a slow and costly operation, did not appeal to them. They rebelled especially against the idea of pulling the spikes one by one. Result: a device that literally rips the rails from the ties at a rate of about 3 mph.

Called a "ripper," the device is designed to be pulled by a work train. It consists of a heavy structural-steel frame from the rear of which a large-diameter round-steel bar extends outward from each side. The frame, which is narrow enough to fit between the running rails, is open top and bottom and has a short nose at its front end to which towing cables are fastened.

In approaching the problem of re-



RIPPER is towed by a work train. Its frame holds the ties down while the side bars

"Ripper" provides

Fast way to take old tracks

ducing a double-track line to single track both tracks are inspected to determine the track sections that are to be removed. The track increments having the best rail and tie condition are, of course, scheduled to remain. Locations of the necessary passing tracks and hot-box set-out tracks are determined by the operating department, and the ends of these tracks are established. At the time of inspection, consideration may also be given the matter of relocating portions of the remaining main track with the view of improving its location with respect to the edge of embankments or to bluffs.

Preparatory to the operation of the ripper, two men with power wrenches remove two of the four bolts from each joint. They also loosen the other two for expediting complete removal later on by hand. At the same time, other trackmen remove all rail anchors from the rails. Turnouts for passing tracks are also installed at this time.

The track is now ready for operation of the ripper. It is used with a work train consisting of a caboose, a locomotive, a work car on which the ripper

is transported, and a locomotive crane. The ripper is placed on the track to be removed, with the frame resting between the rails, and towing cables are attached to the crane. Spikes are then pulled by hand from each running rail for a distance of one-half rail length. A pair of joint bars is removed from each rail and the rails are raised high enough to permit the side extensions of the ripper to be pulled beneath them.

The work train then moves ahead at a speed of about 3 mph. The lower flanges of the frame hold the ties down while the side extensions raise the rails, causing the spikes to be pulled.

It might be expected that this operation would cause the spikes to suddenly let go and fly in every direction. But this occurs only in rare instances. About 60 per cent of the spikes are pulled out by the ripper. The other spikes, having been driven into ties renewed with the last few years, resist pulling. This causes the ties to move along and bunch until the spikes either let go or their heads bend sufficiently to allow the rails to pass them.



tensions raise the rails, pulling the spikes.

JOINT BARS are removed and all other track materials are separated into piles for magnet loading.



USABLE CROSSTIES are piled by a Speed Swing. Later, they are loaded and shipped to other points for use.



Old track apart

After passage of the ripper, the track looks at first glance like the aftermath of a severe storm. The rails, though undamaged, rest on the ties in a helter-skelter alignment. Here and there, one of the two remaining bolts of a joint has broken so that the ends of the adjacent rails do not meet. The ties are torn out of their beds and are bunched in places, making the track look like it has suffered a washout. A few tie plates have been swung 180 degrees out of position.

However, it is all for the good. It is now relatively easy for trackmen to remove the remaining two bolts from the joints. Also, they pull any spikes not already pulled and they pile the bars, bolts, anchors, plates and spikes for magnet loading. A foreman and two trackmen classify and mark the rails for loading, after which a work train follows and loads the rails and bars. A second pass of the work train loads the other track materials.

Also, with the ties now up where they can be inspected, the ones found not suitable for reuse are piled and either burned or given to some neighbor-



BALLAST is of good quality, so it is cleaned and loaded by an Athey Ballast Reclaimer for use elsewhere. Roadbed then serves as a roadway for M/W off-track equipment.

boring farmer. The usable ties are picked up by a Speed Swing loader equipped with a two-prong fork and piled on the embankment shoulder. Later, these are loaded into cars by a crane and shipped to other points.

Since the ballast is of good quality, being either crushed slag or hard limestone, it is recovered for use elsewhere. Using an Athey Ballast Reclaimer the

ballast is first cleaned and then loaded into gondolas. The roadbed is then smoothed by a Caterpillar motor grader to provide a roadway for track-maintenance machines and trucks.

While cost figures for this method of taking up track are not yet available, the road is convinced it is saving money and that the work of removing track has been speeded up.

TOTAL destruction was inflicted by the fire on 636 ft of the north approach trestle to the L&N's main-line bridge over the Pascagoula river in Mississippi.

- About 11:40 one Friday night last fall the engineer of Louisville & Nashville passenger train No. 98, en route from New Orleans to Cincinnati, saw a flicker of flames ahead.

The flames, he soon learned, were coming from a long timber trestle that formed the north approach to the road's bridge across the mouth of the Pascagoula river near Gautier, Miss.

In an effort to keep the fire under control the engine crew went to work on it with hand fire extinguishers. The L&N's fire-fighting crew from nearby Bay St. Louis, Miss., was also called to the scene, as was a Coast Guard fire-fighting boat stationed at Gulfport, Miss.

The combined efforts of these forces kept the flames from spreading to the timber deck of the girder spans comprising the main portion of the bridge. But they couldn't save the trestle. By early Saturday morning 636 ft of the approach were a mass of charred, smoking timbers and twisted rails.

How trestle was rebuilt

Less than 120 hr later, on the following Wednesday afternoon, the trestle was opened for traffic. Here's the story of how it was done:

A quick estimate by the division engineer's office at Mobile, Ala., indicated that approximately ten days would be required to restore the trestle to service. However, a more careful inspection of the trestle revealed a fortuitous circumstance. Because the fire had occurred at high tide it was apparent that the piles could be cut off just above this level and frame bents applied over them. This procedure alone would save considerable time compared with that required if it were necessary to drive piles.

To further expedite the work it was decided to prefabricate the frame bents to the extent possible. At the south end of the structure the bents could be prefabricated on barges and handled directly into position. At the north end, however, the water was too shallow to



Burned-out trestle is

L&N engineers at first figured it would take about ten days to get more than 600 ft of trestle back into service after it had been destroyed by fire. Fortunately, thanks to circumstances and their own resourcefulness, this estimate turned out to be on the pessimistic side. After only a little more than three days of actual work the main-line trestle had been rebuilt and was ready to be placed into service.

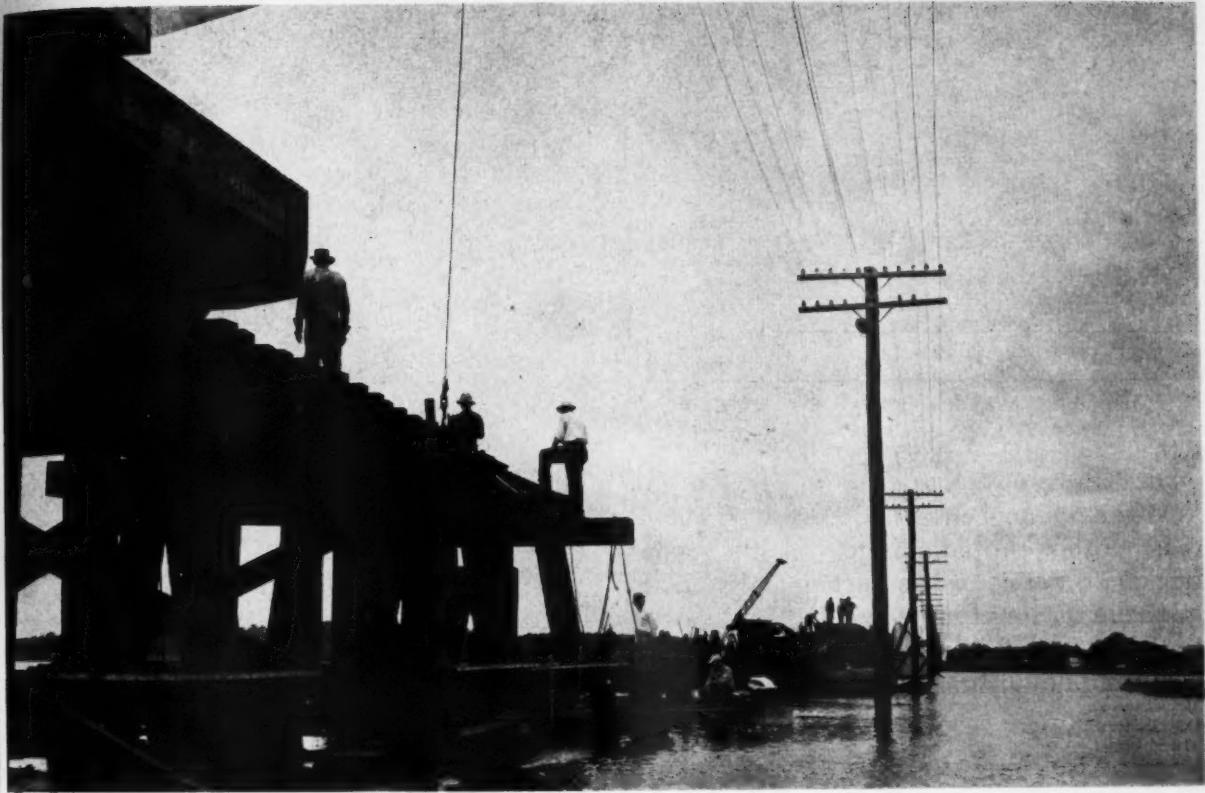
allow this procedure, and the embankment was too narrow to permit the bents to be assembled at a convenient point on shore. It became necessary, therefore, to assemble them in the final position.

Meanwhile, preparations for rebuilding the trestle were under way. Workmen were ordered to the site from as far away as Georgiana, Ala. Emergency bridge material and the tools and equipment needed for the work were rounded up. By noon Sunday the preliminary arrangements had

been completed and the necessary men, materials and equipment were on hand. They included:

Men: Three separate bridge crews, totaling 36 men, had been moved to the site, along with their camp cars. Two of the crews originated on the Mobile & New Orleans division, on which the trestle was located. The third crew came from the Pensacola division.

Materials: Piling, caps, stringers, and other timber had arrived at the site from emergency stores located at



Trestle is rebuilt fast

Mobile, Ala., Ocean Springs, Miss., and Bay St. Louis. Some additional material was purchased from a private wood preserving plant only a few hundred feet from the burned-out trestle.

Equipment: Two pile drivers, two 30-ton diesel locomotive cranes, a crawler crane and three barges were assembled at the trestle. In addition, four Kohler 5-kw power plants were rushed to the job along with electric drills and chain saws. A number of gasoline chain saws was also available.

Barges expedite work

One of the locomotive cranes was put to work unloading material; the other was moved to the north end of the trestle. There it commenced the task of removing the heat-twisted rails and burned timbers, and handling materials into position for the new bents and panels.

At the same time, work was progressing at the south end of the trestle.

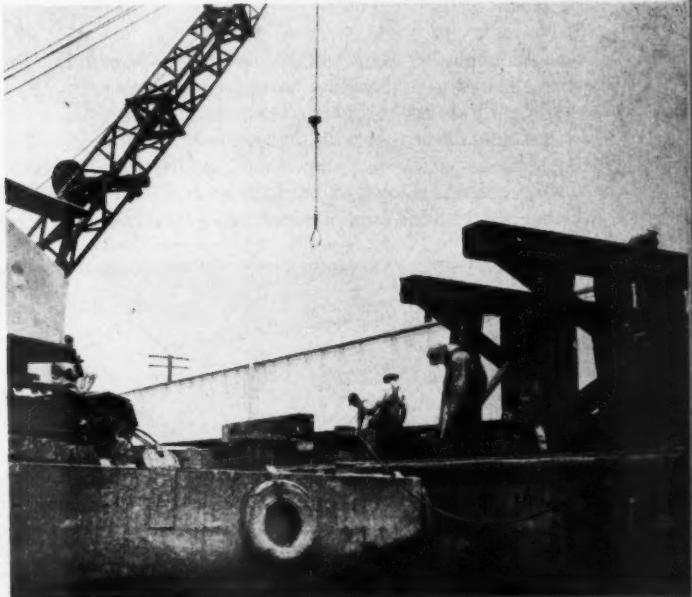
RECONSTRUCTION of trestle (above) was progressed from both ends. Piles were cut off above high water and frame bents applied over them.

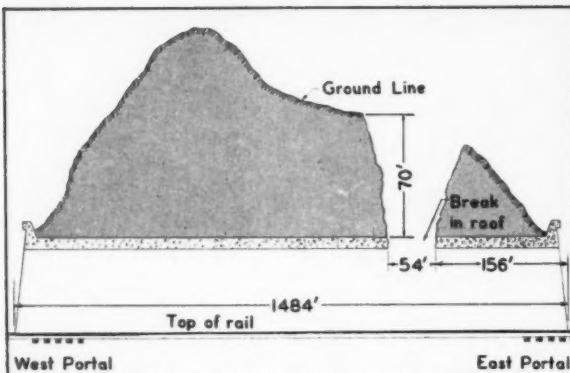
FRAME BENTS for south end of the trestle were prefabricated on two barges and installed by a 30-ton crane working from a third barge.

Frame bents for this end were prefabricated on two of the barges, which were anchored adjacent to the trestle. The crawler crane operated from the third, removing the damaged material and installing the new bents. Longitudinal bracing was installed as required. The pile drivers were called on to drive piles for only two bents.

Rebuilding the trestle continued around the clock with the aid of an emergency lighting system. Two of the generators were utilized for this purpose. The other two powered electric tools and equipment.

Plans are being made to replace the trestle with a permanent structure sometime in 1960.





ROOF COLLAPSE resulted in "chimney" extending to surface.

When a tunnel cave-in occurs the first and most urgent problem is to get the tunnel back into service. The second is to determine the reasons for the failure. That's what the Pittsburgh & West Virginia did last fall when the lining failed in one of its tunnels.



TOTAL of nearly 40,000 cu yd of material was removed from the hole.

Arch failure blocks 1500-ft

- All appeared quiet and normal on the 132-mile Pittsburgh & West Virginia early on the morning of October 7 last year. But this outward appearance of normalcy was soon found to be deceptive. Something drastic had happened in State Line Tunnel No. 8

—something that was to stop traffic movements through the tunnel for 14 days.

State Line Tunnel No. 8 is in CTC territory. About 2 am on October 7, 1959, a red signal appeared on the control board indicating what was be-

lieved to be a signal failure or a broken rail. A signalman, one Jack Hartline, was called to check the track circuits. He found nothing amiss until he reached a point about 150 ft from the west portal of Tunnel No. 8, a 1484-ft concrete-lined bore. There he stopped short in astonishment. The tunnel was completely blocked by a great mass of debris that obviously had fallen into it as a result of collapse of the concrete arch. Moisture in the fallen debris had shunted the track circuit, causing the red signal.

Inspection by Chief Engineer D. L. Jerman and members of his staff revealed that approximately 54 ft of the tunnel arch had fallen and a "chimney" had formed reaching to the surface of the ground. The chimney was about 50 ft in diameter and 70 ft deep.

Plan of action

With traffic restoration the first objective a plan of action was quickly developed and set in motion. Briefly it called for removal of the debris in the tunnel and the installation across the 54-ft opening of 8-in wide-flanged beams, rolled to the contour of the con-



ROCK FACE at existing fault formed one side of "glory hole" at the top. Other sides were stabilized by cutting them back down to a level about 50 ft below the surface.



MATERIAL at break was mostly unstable shales and clays inclined 30 deg (see next page).

tunnel on P&WV

crete lining. With the beams in place as a temporary expedient traffic could be resumed while permanent repairs were decided upon and carried out.

All available company manpower and equipment were quickly mobilized for restoration work, and a variety of additional equipment was hired from outside companies. One of these was Murphy & Company, a local contractor. Murphy equipment, including a Caterpillar Traxcavator No. 955, three dump trucks and a bulldozer, was put to work initially removing material from the west face of the fallen debris. To provide suitable working conditions for this equipment the ties and rail were covered from the fall to a point beyond the tunnel portal.

Later on the Traxcavator was shifted to the east face of the fall where it was used to load the debris into side-dump cars. This operation was facilitated by the fact that the tunnel some time ago had been converted from double to single track with the remaining track being left approximately in its original position. With extra space thus available along one side of the tunnel the Traxcavator could load its bucket, move back to a point along the side of

a dump car, make a right-angle turn and dump its bucket into the car. To facilitate this operation a ramp was built alongside the track.

Transfer of the Traxcavator from the west to the east face of the fall took place when a second outside company entered the picture. This was the Harrison Construction Company. The equipment it brought to the tunnel included a 1½-yd Eimco "overshot" loader and three bottom-dump trucks. These units were put to work loading out the material at the west face. The procedure was for the loader to fill its bucket at the working face, move back about 10 ft, or until it touched a waiting truck, and then swing the bucket overhead to dump into the truck.

Gradall proves useful

Now a problem developed. As material was removed from the fall the faces tended to become vertical, creating the hazard of suddenly collapsing on the excavating equipment. To forestall this possibility a large Gradall was brought in. With its bucket at the end of a telescoping arm this unit could reach out from a safe distance and pull

the material down where it could be safely loaded by the Eimco or Traxcavator.

Meanwhile the restoration work was proceeding from another angle. From the beginning it was evident that the sides of the chimney, or "glory hole" as it was called, could not be expected to stand alone. On one side of the hole was a rock face formed by an existing fault in the overlying Morgantown sandstone. The other sides, consisting of fireclay and broken shale, had to be stabilized before workmen in the tunnel below could safely venture out from under the sound tunnel lining.

A fairly stable stratum of rock was found to exist about fifty feet below the surface. It was decided, as a stabilizing measure, to cut back the sides of the "glory hole" down to this stratum. Below this level the sides of the hole, while nearly vertical, were judged to be sufficiently stable to remain standing without the need of further attention.

Widening the "glory hole"

For cutting back the sides of the hole a 1½-yd crawler shovel assisted by a bulldozer was used. Cabled together somewhat in the manner of mountain climbers, the shovel and the bulldozer worked their way down to the rock strata, building a ramp as they went, and then proceeded to construct a bench around the chimney by removing the material above the stratum. The material excavated was hauled away in dump trucks.

The Gradall was also found useful in helping to stabilize the side walls of the chimney. Working from the surface of the ground at the rim of the hole the Gradall proved particularly useful in reaching down and removing broken rocks from the side walls.

Placing the ribs

With the sides of the hole thus stabilized the work of placing the steel ribs across the breach in the tunnel roof could proceed. The ribs were specially rolled for this job by the Commercial Shearing & Stamping Company. They were placed in the tunnel on 1-ft centers for a distance of 60 ft. As a cushion to prevent damage to the beams by falling objects the hole was backfilled up to the level of the bench.

The fact that nearly 40,000 cu yd

Cause of the failure

Arch failure in tunnel

cont'd

of material was removed from the tunnel gives an idea of the magnitude of the restoration work. Removal of this material was complicated by the presence of a large number of 50-ton boulders. Because dynamite could not

be used due to the unstable nature of the surrounding formations, a rock jack proved useful in breaking up the large pieces.

As a permanent corrective measure it is planned to "daylight" the westerly

200 ft of the tunnel. It is estimated that the cost of daylighting, including a new portal and the erection of a slide detection fence, would be very close to that for repairs utilizing the steel supports. Daylighting has the advantage, says Mr. Jerman, of eliminating future maintenance.

Failure laid to unsymmetrical load on lining

For the purpose of analyzing the reasons for the tunnel cave-in, D. L. Jerman, chief engineer of the Pittsburgh & West Virginia, prepared a report that included pertinent historical facts about the tunnel and information regarding the surrounding geological formations and the construction of the lining. Following is an abstract of this report. Editor.

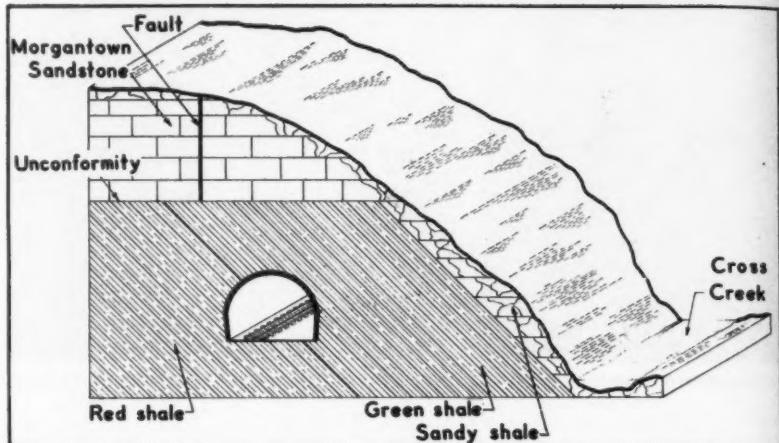
State Line Tunnel No. 8 was completed in 1903. It was constructed on a 0.7 per cent grade ascending westward and was built to accommodate two tracks. As the excavation progressed the tunnel was lined with timber consisting of 12-in by 12-in foundation sills, plumb posts, wall-bearing plates and ring segments.

The openings between sets were closed with 4-in timber lagging. The void between the lagging and the rock-face overbreak of the tunnel excavation was packed with timber. Concrete portals and short sections of tunnel barrel were constructed at both ends of the structure.

In 1909 the tunnel was relined with unreinforced concrete. In 1931 extensive shotcrete repairs were made to the surface of the concrete, and in certain wet areas the lining was grouted beyond the depth of the concrete. Portal repairs and corrective drainage measures were undertaken at the same time.

The tunnel pierces a steep hillside "nose" created by the circuitous course of Cross creek. Hence both portals are situated in Cross Creek valley. Maximum cover above the tunnel is about 170 ft.

The tunnel lies in the upper third of the so-called Conemaugh geological formation, which consists of shale, fireclay and coarse sandstone, with occasional thin beds of limestone and coal. Most of the shale is sandy but there are prominent beds of green and red, fine-grained fireclay shale. The tunnel



TUNNEL lies in the so-called Conemaugh formation, consisting of shale, fireclay and coarse sandstone with occasional thin beds of limestone and coal.

was driven through the beds of soft laminated shales and fireclays lying directly below the thick-bedded Morgantown limestone. The blocked and faulted sandstone is a notorious water-bearing strata.

The strata in the area of the collapse consists of clays and bedded shales inclined at about 30 deg toward Cross creek. These clays and shales end in a nonconformity upon which is situated the Morgantown sandstone. (See isometric drawing.)

The shales are excessively laminated, soft and prone to shattering, but not to the same degree as the fireclays. The shales run in thin layers, with cleavage planes of a greasy soap-like film offering little cohesion. This stone is especially treacherous in the presence of water as the soapy film deteriorates rapidly when wet. The shale weathers quickly in the presence of air and reverts to clay.

The fireclays are not hard and are found in stratified layers. Usually the cleavage planes are of the same nature as those in the shale. If the clay is placed in water it flakes immediately and in 15 min is reduced to colloidal clay. The harder fireclays are brittle and shatter badly.

A design check of the concrete lining revealed that there was sufficient strength in the concrete design to support all the overburden involved in the collapse with an additional one-third safety factor, provided the liner acted as an arch. The concrete at the site was found to be sound with no signs of deterioration. A great deal of water runs into the tunnel from the surrounding clays and shales.

Investigation revealed that these conditions existed at the location of the failure: (1) An inclined plane based on the red fireclay cleavage had placed an unsymmetrical load on the north half of the tunnel arch; (2) ample water to lubricate the soapy cleavage planes of the clays and shales; (3) decayed wood packing behind the concrete lining; and (4) the presence of cracks in the crown and haunches of the lining due to localized stresses.

It was concluded, therefore, that:

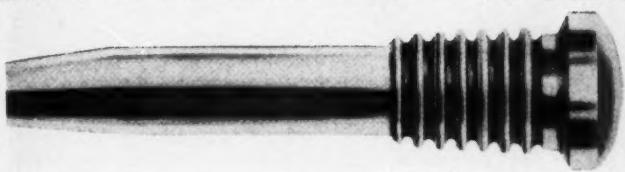
(1) The tunnel lining was of proper and ample design for the normal expected rock pressures in this bore.

(2) The collapse was caused by unsymmetrical loading of the lining in addition to stressing the concrete lining in a manner for which it had not been designed.

ALL ALONG THE LINE . . .

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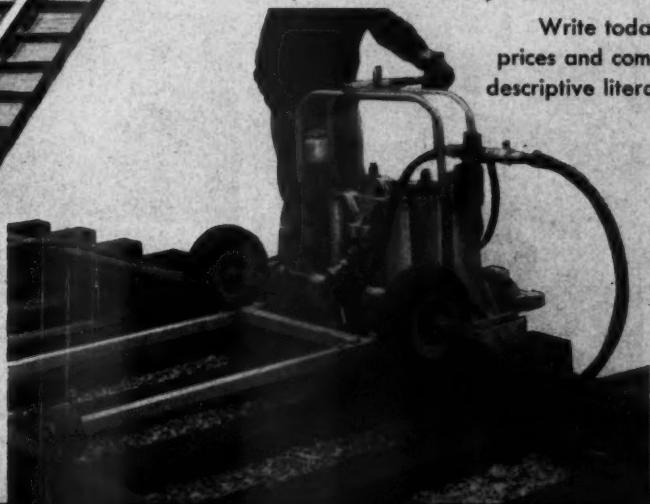
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Model shows line change in Arizona

Aboard the "director's special" last fall, the Santa Fe's board of directors gathered around a relief model (above) of the 44-mile line change under construction from Williams, Ariz., to Crookton. The road's president, E. S. Marsh (third from left), and R. H. Beeder, chief engineer, system, used the model to describe the project. The model was constructed (left photo) by the Santa Fe's engineering department out of modeling clay, poster board and plywood. Colored map pins and black thread were used to show rail lines and highways. This photo shows modeling clay being placed between cross sections by Assistant Engineer J. E. Inman, with Assistant Engineer C. E. Peterson looking on.

News briefs in pictures . . .



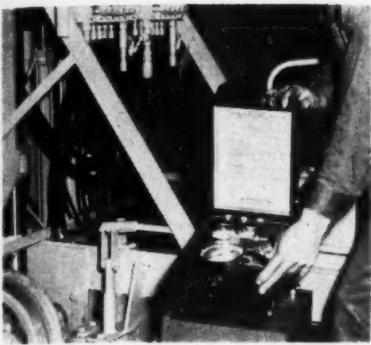
Visits concrete tie plant

The prestressed-concrete-tie-making plant of the American Concrete Crosstie Corporation, Tampa, Fla., was recently inspected by G. M. Magee, director, E. J. Ruble, engineer structures, and M. F. Smucker, assistant electrical engineer, all of the AAR research staff. Inspection group, shown above includes representatives of the American Concrete Crosstie Corp.

Conversion units installed

To give its three new inspection sedans greater flexibility the Rock Island has equipped them with W. T. Cox Rail-Road conversion units. Photo at left shows A. L. Woten, superintendent of the road's motor car shop, testing one after installation.

STRUCTURES PRODUCTS



For use in shop or field . . .

Hydraulic tester

WEIGHING less than 20 lb, the Schroeder portable hydraulic circuit tester is designed to be quickly connected into the hydraulic system of a machine for the purpose of measuring its temperature, volume and pressure. The unit is said to measure temperatures up to 250 deg, flow up to 100 gpm and pressures up to 5000 psi. The manufacturer points out that the tester can be used in the shop for testing the hydraulic system of a machine before and after overhaul or in the field for quickly locating faulty pumps, valves, cylinders or circuits. *Schroeder Brothers Corporation, Dept. RTS, McKees Rocks, Pa.*



Paint spots made with . . .

Tie marker

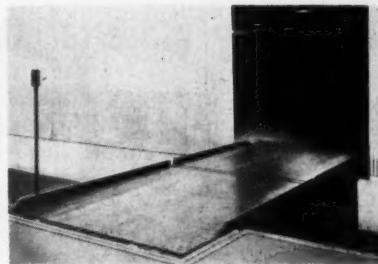
TIES can be quickly and easily marked for removal, it is claimed, by means of Nelson Log Marking paint and the Nel-Spot Paint Hammer. The log marking paint is contained in a pint can which has a porous applicator sealed in its neck. The paint hammer consists of a bracket located at the lower end of an 18-in long wood handle

into which the can of paint is clamped, applicator down. When the applicator is tapped lightly against a tie or rail it oozes enough paint to make a bright round mark about 1½ in. in diameter. The bracket is attached to the handle so that it can be turned through 360 deg, locking in all positions to permit marking from any angle. The can of paint can also be carried in an upright position in the bracket. A plastic cap is provided for covering the applicator to prevent the paint in it from drying when not in use.

The manufacturer states that the device can be used for both rapid or intermittent marking and that there is no dripping, splashing or spilling of the paint. The paint is claimed to require no stirring and to be weather and water resistant. It is available in a variety of bright, non-fading colors, including yellow, orange, red, green, blue, white, black, brown and aluminum. *The Nelson Company, Dept. RTS, 601 South Carpenter Ave., Iron Mountain, Mich.*

Ramps eliminated by . . .**Crossover bridge**

DETOURS and ramps can be eliminated by the use of a new double-leaf bascule-type crossover bridge which forms a roadway across roads and railway tracks. The deck of this structure is 8 ft wide and has a span of 21 ft. The deck is positioned by



push-button control from either end and is operated by electrical-hydraulic power units.

The manufacturer states that the capacity of the new bascule-type crossover bridge is 25,000 lb. It is also stated that the actuating cylinder which lifts and lowers the deck is mounted on the roadway and requires no excavation below grade.

The deck moves from full-vertical to full-horizontal positions and weighted, hinged legs automatically lower to support the span at its middle. These legs are fitted with adjustable plates to compensate for variations in floor level. The bridge is fabricated of structural-steel shapes with all-welded construction. Decks are available with either non-skid or smooth surface plates. The deck is recessed within the building line and attached with a continuous hinge to the dock. *Rowe Methods, Inc., Dept. RTS, 2534 Detroit Avenue, Cleveland, Ohio.*



Stop running cars with . . .

Car retarder

INTENDED to replace the usual track skates tended by skatemen at the lower ends of classification-yard tracks, a new mechanical car retarder has been made available. Designated the Racor Mechanical Car Retarder, this self-contained mechanism is said to stop loaded cars traveling about 9 to 10 mph or empty cars up to 15 mph.

The retarder is made up of two retarding units located opposite each other, one on

each running rail. Generally supplied in 39-ft lengths, each retarder unit is comprised of one running rail and two retarder rails, connected by nine powerful spring assemblies.

When a car enters the unit, retarder rails are forced apart against spring pressure, thus exerting a braking effect on the wheel. The Racor retarder is said to be equally effective with two or more coupled cars because it acts individually on each set of trucks. *American Brake Shoe Company, Dept. A-RTS, 155 N. Wacker Drive, Chicago 6.*

Stand-by material at hump yards

To what extent should stand-by track and turnout material be provided at hump-retarder yards for emergency repairs? Explain. Where should this material be stored?

Check stocks

By H. C. KOCH
Roadmaster
Belt Railway of Chicago
Chicago

Storing sufficient track and turnout material for emergency repairs at hump-retarder yards and other strategic locations is considered good practice. Periodic checks are necessary to avoid under and/or over stocking of material at any location.

Storing a larger stock of material than necessary for the general run of emergency repairs increases inventories if this practice requires the purchase of replacements for the main store stock. Material for programmed out-of-face turnout renewals, if stored on the "hump" when received, will reduce handling expense. It should be considered available for emergencies until installed in the track. The general condition of turnouts and other installations will have a bearing on the amount of stock to store.

Suggestions concerning material stored on hump of classification yards

are shown under one of the following headings:

(1) Material for lap switches, crossings and other special installations not used at other locations:

Purchase in quantities to cover requirements. Store adjacent or convenient to hump installations. When necessary to use these spares, carefully inspect the released material. Economic repairs to provide suitable spares are less costly than purchasing replacements.

(2) Rail:

Rail is generally delivered by work trains or heavy-duty motor cars. Because such equipment is not readily available during emergencies and as it cannot be handled in the type of trucks ordinarily in service on a railroad, the amount of rail stored at the "hump" end of retarder yards for emergencies must be checked frequently.

(3) Other track and turnout material:

The location of the main store stock and the method of delivery are im-

portant and must be considered when determining the amount of other material to be stored on the "hump." Emergency stocks of miscellaneous material can be reduced if trucks are readily available. The trucks preferably should be equipped with suitable loading and unloading equipment.

Only special parts

By N. H. MAAS
Roadmaster
Chicago & North Western
Proviso, Ill.

The need for carrying emergency track and switch material for hump-retarder yards should be no greater than for flat-switching yards for the following reasons:

(1) As a hump yard is the so-called life line of any large operating yards, the degree of maintenance should be above the average.

(2) Present retarders available on the market are equipped with rerailing frogs which reduce derailments due to squeeze-outs and thus reduce track damage.

(3) Track and switch materials usually are available at various points throughout a large yard and can easily be trucked to a point of need.

(4) All emergency materials carried on hand specifically for hump-

NEW QUESTIONS to be answered in May

Do you have an answer to any of the questions listed below? If so, send it in. Payment—based upon substance and length—will be made for each published answer. If you'd prefer that your name be withheld, we'll gladly comply.

DEADLINE: March 30

- 1. On roads where section gangs are responsible for track maintenance and highways are not convenient for truck use, can sections 50 miles or more in length be justified economically without lowering track standards? If so, can such an organization adequately cope with severe rain, wind and snow storms? If not, what is the best solution? Explain.

- 2. When piling is found to be decaying at the ground line, what is the minimum allowable diameter of remaining sound wood before posting is recommended? How many piles in a bent can be posted before framing is necessary? What proportion of the bents in a bridge can be framed before redriving is recommended?

- 3. What factors determine the necessity of providing a portable set-off for a track machine? Is the weight of a machine the primary factor? Explain.

- 4. What type of equipment can be used to advantage to remove drift

that has accumulated against a bridge? Explain advantages.

- 5. How does one determine whether a crossing frog should be built up or repaired? Are we going too far today in rebuilding frogs and crossings? Why?

Send answers to:

**What's the Answer Editor
Railway Track & Structures
79 West Monroe Street
Chicago 3, Illinois**

Do you have a question you'd like to have answered in these columns? If so, please send it in.

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What's the answer? (cont'd)

retarder yards should be stored as close as possible to the point where it might be needed.

(5) Any special parts required for hump-retarder yards only, however, should be held in stock—the quantity depending upon the time required for replacement.

Judge by hindsight

By G. W. GUINN, Jr.
Asst. Engineer of Construction
Richmond, Fredericksburg & Potomac
Richmond, Va.

The question of how much standby track and turnout material should be kept on hand at hump-retarder yards has long been a problem of the maintenance supervisor.

Generally speaking there is no hard and fast rule to govern such a problem. Normal wear and tear of track and turnout material can be anticipated and, therefore, can be taken care of in the regular maintenance

programs instituted on the property.

Emergencies do arise, however, and steps must be taken in advance to handle these emergencies. One very good way of coping with such emergencies is to list all track and turnout damages occurring during the preceding year and keep enough material on hand to make the same repairs should they happen again in the future.

Since, of necessity, the railroad maintenance gang has been continually reduced in size, the emergency material must be stored in a central location where it can be reached by whatever means available.

Stock certain items

By R. E. PALMER
Roadmaster
Chicago, Milwaukee, St. Paul & Pacific
Chicago

Answering the question, there are many things to consider in making this decision.

The first would be to what extent the item will affect the operation if

the part is not on hand for immediate use. How long will it take to get the part? Can it be made in our own shop or does it have to be made by the suppliers?

Does the item lend itself to repairs, such as welding and straightening, to the extent that it can be used until new items are furnished?

After analyzing each of the above questions, it will then be necessary to stock such items as will have to be replaced immediately. In general, these will be such items as frogs, points, special rods, Samson stock rails, and the like. Also, several pieces of 39-ft rail of the section necessary at that location should be on hand so they can be cut for any dimension rail that may be required.

This material, generally speaking, is all of a special nature and used only on the hump. Therefore, it should be stocked at a material yard and properly marked so it is readily available when needed. The closer this material yard is to the hump the better. This yard should have a track connected to the hump and also a good all-weather road.

Making surfacing run-offs

When raising track, how long should the run-offs be constructed to allow the passage of trains? What speed restrictions should be set in such instances?

Several conditions involved

By J. H. BECKER
Section Foreman (Ret.)
St. Louis-San Francisco
Festus, Mo.

When raising track I would say the run-off would depend on the height of the raise, the condition of the track, and the speed of the trains. However, I think most roads are issuing train orders with speed restrictions to cover the place of work from a certain time in the morning to a set time in the afternoon. This relieves the foreman in charge of a lot of responsibility and makes his work easier for him.

So, if I was raising track from four to six inches and the ties were not very good, I would make the run-off not to exceed one-half inch to each 36-ft rail. I would also see that the run-off is well tied before leaving it for night traffic.

Of course the run-offs will be very different for curves and straight track and the foreman will have to use his best judgment with respect to train speeds at that location.

Speeds determine length

By L. V. BLEDSOE
Supervisor Track
Chesapeake & Ohio
Huntington, W. Va.

At present, all our main tracks with few exceptions are raised with mechanical equipment. Most of our yard-track surfacing is still done with hand tools, but we are beginning to use more mechanical equipment there. With mechanical equipment we find that it is only necessary to tamp every other tie in making temporary run-offs.

In general, when starting to surface a section of track, we provide a run-off of 1 in per 39-ft rail where the maximum speed is over 40 mph. We use 2 in per 39-ft rail length where the maximum speed is under 40 mph. We find these run-offs ride well and are safe as our maximum raise is usually about 2½ in.

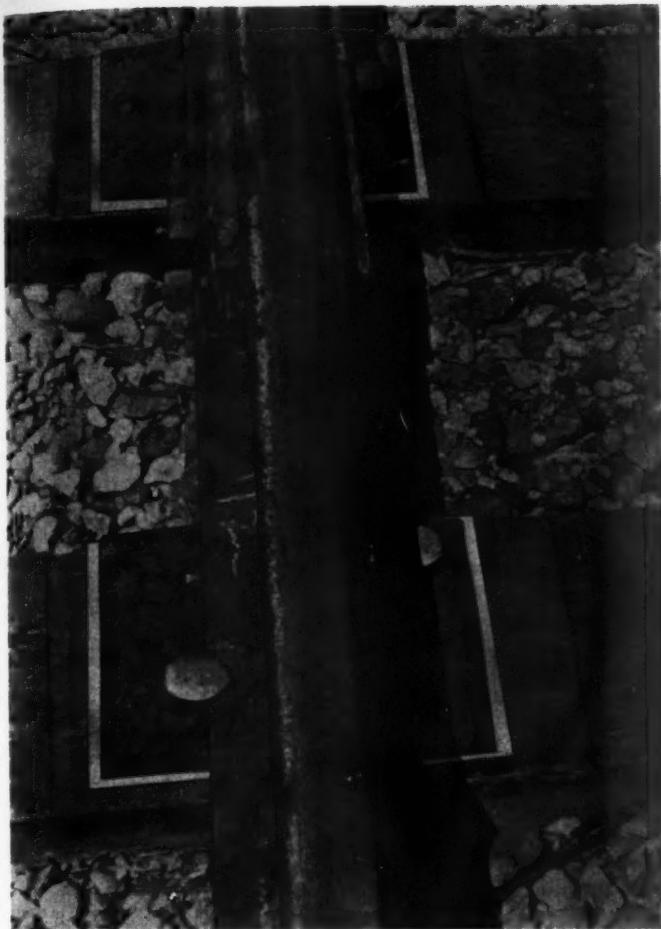
We seldom find speed restrictions necessary. Extra precautions are used on sharp curves or tight track to prevent buckling.

When using mechanical tamps, traffic is usually detoured and run-offs are only necessary at the end of the day's work.

Consistent with speed

By J. L. STONE
Roadmaster
Atlantic Coast Line
Waycross, Ga.

There are many factors that should be considered in the construction of a run-off and the placing of a speed restriction. These include the general track condition, weather, temperature,



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*Patent Applied for

What's the answer? (cont'd)

height of raise, method of surfacing, direction of traffic, etc. I do not think that any set rule governing the length of run-offs would be practicable, due to these varying conditions. Therefore, the personnel in charge of the immediate operation should consider these factors, place speed restrictions, if any, and construct a run-off consist-

ent with the conditions at the job.

When track is raised above one inch it is desirable to have a speed restriction over the section of track being worked during the assigned work hours. This speed restriction should be consistent with the height of raise. At the close of the work day, the restriction should be removed where conditions are such that it can be accomplished.

All run-offs constructed during

work hours under speed restrictions should be as short as practicable to eliminate duplication of work. The run-off to be constructed at the close of the work day where there will be no speed restriction should be of sufficient length to accommodate the traffic of the highest speed. However, all run-offs should be of sufficient length to be consistent with the practice of safety and should afford good riding quality.

Obtaining additional building material

Frequently, after a building foreman starts work on a job, he finds more work which should be done than is on his work sheet. To what extent is he authorized to procure additional material locally for completing all necessary work? How is this arranged and what steps must be followed for authorization of the additional work?

Must first clear order

By J. A. BRIGHT
Supervisor Building—Repairs
Atlantic Coast Line
Jacksonville, Fla.

For a number of years we maintained a supply of building materials for maintenance work and small construction jobs at our Export Terminals yard, Jacksonville, Fla.

We employed a crew of four laborers and one mechanic to handle the loading and unloading of this material. Total labor cost was \$82.67 per day, five days per week.

In April 1958, we had a bad fire at our Jacksonville material yard which destroyed the storage shed and warehouse along with a considerable amount of lumber in the yard. Immediately after the fire we stopped shipments to the Export Terminals yard and worked out the stock we had left in the yard. We then started buying the necessary building materials in small quantities to supply the carpenter gangs. As far as is practical, we have tried to purchase the materials locally where the carpenter forces are working, the purpose being to eliminate the handling cost. In addition, this practice has been very helpful in our public relations along the territory we serve.

When we closed out the building materials yard at Export Terminals, we cut off the mechanic and four laborers at a saving of \$82.67 per

day. This amounts to approximately \$1,777.00 a month.

The purchasing department has made arrangements with certain lumber companies whereby they will be prepared to furnish small quantities of lumber for immediate loading in cars to be shipped direct to the location of the carpenter forces. This eliminates a storage yard and the cost of double handling.

With reference to making an estimate of the amount of materials required to make repairs to any buildings: We try to estimate the amount of materials required to place the building in good repair. Of course, there are times when we under-estimate the materials needed to complete the job. When we do, we usually have a small amount of materials on hand in the roadway-material car which we can use to finish the job. However, if we encounter some condition that requires a considerable amount over that estimated, we ask for authority for local purchase to finish the job before moving to another location. With this method we have been able to maintain a low inventory of building materials. This procedure also eliminates double handling at the material yard.

The foreman is not allowed to make local purchases until after he calls the supervisor of building-repairs and gets the necessary authority. If it is a small purchase the supervisor building-re-

pairs may authorize the foreman to purchase locally and mail in the bill for approval.

If the bill for local purchase is more than \$15, the supervisor of building-repairs secures authority from the chief engineer and then notifies the foreman to purchase the materials that he requires.

No material bought locally

By D. A. SLACK
Engineer Maintenance of Way
Canadian National
Moncton, N. B.

As to the first part of this question, I will say that they have no authorization to buy such material. Only in cases of emergency is such material bought by the B&B master. Each B&B gang has a material car in which is kept all material it normally uses. If additional material is required, it is obtained from the B&B storage yard located at division headquarters.

As to the second part of the question, I believe this is best answered under two headings—maintenance work and capital work.

Maintenance work—All maintenance work required on buildings is drawn up by the B&B master. The total cost is submitted to the division engineer who, in turn, incorporates it in the yearly maintenance budget. This sum is then forwarded to the regional headquarters for approval. The result is that the B&B master has a lump sum authorization for repairs to buildings.

If a foreman finds more work required than anticipated on a particular building, he informs the B&B master. This is usually done verbally during the B&B master's (or his assistant's) weekly visit to the gang when he can be shown the actual work



Five years ago, Matisa introduced the first production-line rail welding equipment to America for tests with American rail and under the tremendous battering of American schedules and heavier axle loads. The results are embodied in this report on . . .

Welded Rail: A Four Year Progress Report

The story of welded rail goes back many years. Early experiments were abandoned as tedious and costly. Then, Matisa Equipment Corporation began making safe, cheap welds fast.

With this head start, the Matisa story has since been inseparable from the story of every advance made in the welding of rail.

MATISA RAILWELD, INC.
1020 Washington Ave., Chicago Heights, Illinois

It took Matisa a year of testing and re-building the equipment brought over from Europe to finally produce safe welds quickly and inexpensively; but in the following years, improved techniques and redesigning of the original equipment definitely indicated a need for basic changes in the original design, to be incorporated by the manufacturer. Matisa requested these improvements, but for reasons which they could well understand, the manufacturer of the old original flash butt welder decided not to alter the entire design for a small segment of its market.

Improvements Built into New Machine

Matisa then submitted designs to other manufacturers and made arrangements to produce flash butt rail welding with equipment incorporating all the improvements developed in 4 years of actual on-track welding.

This is the equipment with which Matisa will be establishing new horizons during the year—but already, with re-built equipment, Matisa has at the present time 140,000 welds in track, with a history of no weld failures.

Now known as *Matisa Flash Thoroweld*, the process is comprised of refined techniques and a re-engineered plant which are today efficient beyond that of any equipment available.

Today's Performance

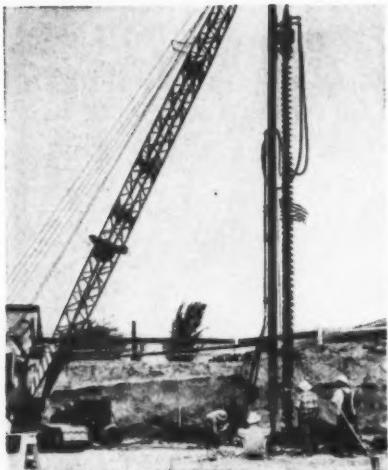
For example, recent improvements have tripled the life of grinding wheels; truly efficient adaption for the use of commercial power is now available; elimination of mechanical shearing devices has not only made a safe weld safer, but has stepped up production by 25%, and required personnel has been reduced. The present operation produces almost twice as many welds per man hour as any other known method or equipment.

Three years ago, Matisa had perfected production-line techniques to the point of producing 80 welds per 8-hour shift; today, Matisa has produced 186 welds per shift—and has produced 356 welds in 20 hours. These are peak performances, but the equipment consistently averages well over 100 welds per shift.

New Developments Here Now

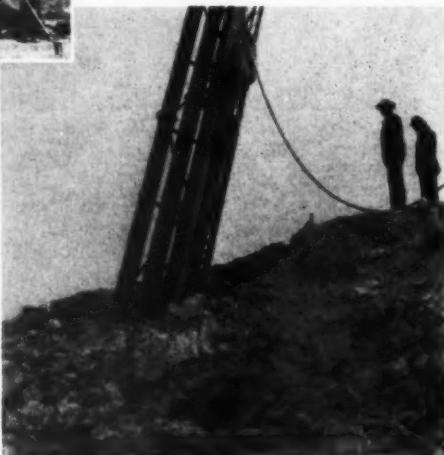
The Matisa program continues. Matisa recently opened its' first Fixed Location Welding Plant at Summit, Ill.—smaller roads with not enough welds to warrant leasing equipment will benefit along with larger roads who can avoid tying up scarce operating capital.

Watch for opening of other fixed location welding plants.



Pre-boring 40 feet deep for pilings

On a new railroad bridge, Ka-Mo drill was used in conjunction with crane pile driving unit. Photo shows how the 12" diameter drill, with 18 h.p. air motor, bored "angle" holes 40' deep through compacted fill for pilings. Ka-Mo drills also save time on: french drain installations, soil testing, holes for signal poles, posts, etc.



How KA-MO drills save time, money for railroads

New hydraulic unit

is shown here drilling 16" diameter holes 30' deep for cast-in-place concrete piling. Fast production was obtained by using continuous drill flight.



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What's the answer? (cont'd)

required. If the B&B master feels the work is necessary, he will authorize the foreman to complete the job. This may mean that some other work which was planned for this gang may be deleted from the yearly program. The B&B master will inform the division engineer of the additional time required to complete the job.

If the additional work is such that a half day or day only is required, the foreman will undertake this work and inform the B&B master during his next inspection. If an excessive amount of time is required, say, a week to a month, and the B&B master feels the work is required, he will get approval from the division engineer.

Capital work—Here the situation is quite different in that each job has a budgeted amount of money. This budgeted amount is allotted by AFE (Authority for expenditure) and is determined by a detailed estimate of each type of work within the job.

In the event a building foreman finds more work than was budgeted, he will inform the B&B master as soon as possible. The B&B master will look into the excess work, and, if required, will inform the division engineer of what the additional work involves. If the division engineer feels the work is necessary and will be within the estimate plus allowable overexpenditure, he may authorize the work. If the additional work will cost in excess of allowable overexpenditure he must request additional funds.

Buy small sizes locally

By G. C. JOHNSON
Bridge & Building Supervisor
Chicago & North Western
Green Bay, Wis.

Prior to any building project work being done on this division, all phases of construction are thoroughly gone over with the foreman and a coordination of ideas is made. Quantities then required to do the job are ordered through the B&B supervisor's office and delivered to the job site. Materials below the 3-in size normally are purchased locally. Larger sizes are procured through the purchasing department to effect better prices.

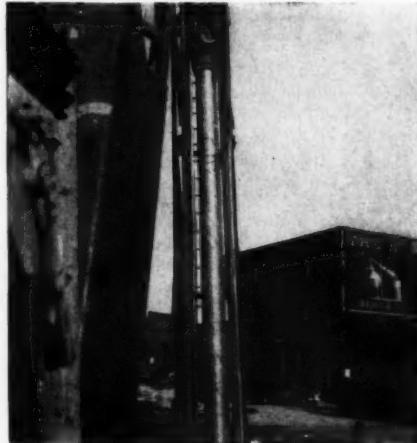
Once a project is started on this division, the only shortage that can be encountered would be in small size

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What's the answer? (cont'd)

lumber, roof shingles, nails, hardware, tile, plastic, paint, etc. Through the accounting procedures newly set up

on this railroad, we are able to purchase these locally.

The foreman in charge, after advising of a shortage encountered, is then given authority to purchase locally the materials required to complete the necessary work required by the project.

The above plan makes it possible to carry out and complete our building projects without having any surplus materials left over from any project.

Driving bent piling

Even though a first-class pile may comply with AREA specifications for straightness, it sometimes has a long bend. How should such a pile be started and driven? How much can such a pile be sprung, while being driven, without damage? Explain.

Set before driving

By T. N. LINGLE
Supervisor B&B
Illinois Central
Carbondale, Ill.

A piling that has a bend in it should be placed in the center of the bent if possible. The bend should be parallel with the bent and towards the outside piling. However, if it is not possible to place the piling as suggested, care

should be taken to get the piling placed before starting to drive as near to its permanent position as possible.

It is not practical to try to line the piling while driving. In fact practical experience is the best solution for driving such piling. If the pile should strike some underground object, it might cause it to lead off or get out of line after you get 10 or 12 ft of penetration. This will make it necessary to

line the pile with the rest of the bent to the extent its length permits.

The longer the pile the more it can be sprung at the top, possibly four or five feet, before breaking off at ground line. If short (10 or 12 ft), the pile can be sprung 12 or 14 inches, which is sufficient to enable it to be pulled under the cap enough to brace.

Start it right

By W. A. LANGFORD
B&B Supervisor
Missouri Pacific
St. Louis, Mo.

My experience in driving piles, after a bridge has been laid out according to specifications, is to prebore a hole

NO MORE TRENCHING!
NO MORE JACKING UP TRACK!
This WOOLERY
TIE-REMOVING TEAM
NOW ELIMINATES SLOW,
COSTLY METHOD

After the tie has been cut on both sides by the WOOLERY Tie Cutter, the operator of the Tie-end Remover—who follows closely behind so that operators can assist each other in removing machines from track—lifts the center section out with tie tongs.



A double-ended hydraulic cylinder is then lowered into the tie bed. A simple turn of the valve moves these two pistons outward, pushing the tie-ends completely clear of the rail—whether

working with single or double shoulder tie plates! The crib is now open and only the necessary amount of ballast is removed to admit the new tie.

Use the WOOLERY TIE-END REMOVER in conjunction with the improved model NU WOOLERY TIE CUTTER! It's the perfect team for greater savings on tie renewals—and gives smoother, safer track, too!

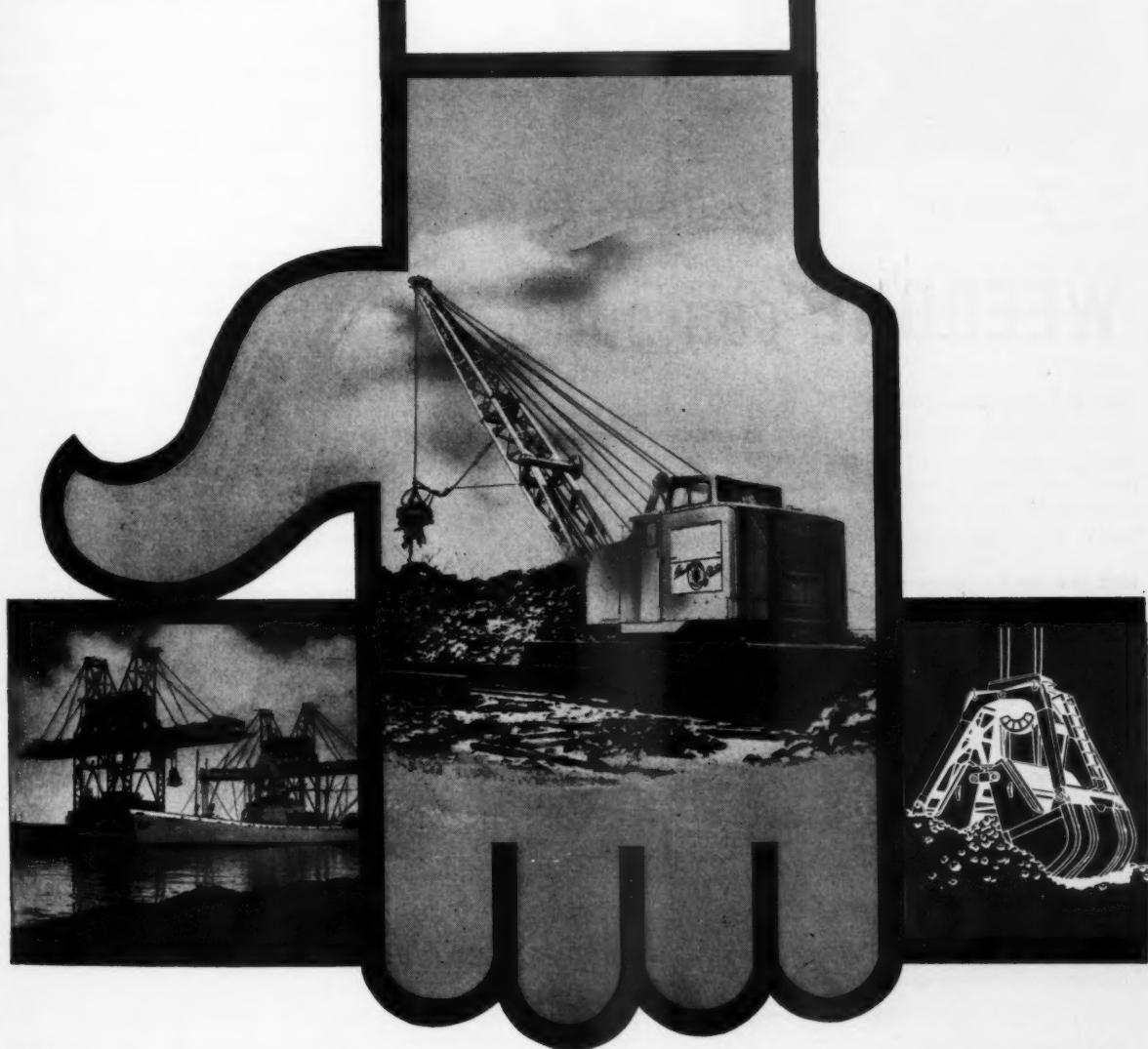
For highest efficiency two Tie Cutters should be used ahead of one Tie End Remover.

The trend toward heavier rail and double shoulder tie plates has made removing tie-ends increasingly difficult. With the WOOLERY Tie-end Remover, this task can now be done in less than a minute by one man with no more effort than that required to turn a valve!



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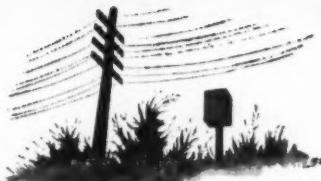
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Line?



Right-of-way?

WEEDONE can solve it!

With the right background—Chemical control of weeds and brush has developed along established lines of procedures and practices. Amchem initially pioneered the major advances in the field, has originated many of today's accepted procedures and products for efficient, economical weed and brush control. Your problems are in *experienced* hands when you hand them to Amchem!

With the right approach—Amchem's corps of weed and brush specialists are basically application specialists. Combining comprehensive theoretical and practical experience they are able to offer all industry a realistic approach to *any* weed or brush problem. These specialists have developed a variety of efficient weed and brush eradication programs over thousands of miles of line, roadside and right-of-way areas once choked and inoperable due to infestation.

With the right product—Amchem's tremendously diversified product line is your assurance that the right weed and brush killer is available and will be utilized for your specific problem. Weedone Brush Killers, for example, have been used in the field for years and proven eminently successful in eliminating weeds and brush wherever they are a problem. Why not bring your problems to Amchem?

Amchem and Weedone are registered trademarks of Amchem Products, Inc.

AMCHEM PRODUCTS, INC. AMBLER, PA.

Please send me copies of your "Brush Control" brochure and full information on the uses of Weedone Brush Killers.

Name _____ Title _____
Company _____
Address _____
City _____ Zone _____ State _____



WEEDONE BRUSH KILLERS

another chemical development of

Amchem Products, Inc.

(Formerly American Chemical Paint Co.)

St. Joseph, Mo. • AMBLER, PA. • Niles, Calif.

What's the answer? (cont'd)

in which to set the pile to permit holding it in proper place while it is being arranged in leads of the driver. Its position in the leads depends on the length of bend, its location, and whether or not it will be below or above the ground.

In each case I prefer the bend to be inside of the bent for three reasons: (1) Placing the bend inside below the ground seems to keep the pile in better line for the bent; (2) when the bend is above the ground it will permit bracing without the use of fillers between the braces and the piles; and (3) when the bend is near the top of pile, it can be driven to provide proper batter whether it be an outside pile or an intermediate pile.

In starting the pile it should be as near in place as possible under normal conditions. This is because the first few strokes of the hammer governs the course of the pile under normal conditions. Once the course is determined, the driver should be moved to exact position and remain there until the pile is driven to the required depth.

I don't think there is much to be gained by springing the pile to its proper position after it is well on its course. However, that would depend on the length of pile and the depth of pile in the ground. The secret of driving is close observance of the pile during the first few blows of the hammer. Any undue strain on a pile during the progress of driving has a tendency to damage or break it.

Use as batter piles

By C. E. PHELPS
Supervisor B&B
Atlanta & West Point, Western
of Alabama, and Georgia
Decatur, Ga.

A pile that is crooked or has a long bend can be driven satisfactorily and will line up with other piles in the bent if the procedure as outlined below is followed:

Use the large or crooked piles for batter piles. In bents 15 ft from cap to ground or lower, turn the bend toward the plumb or inside batter pile. In bents 15 ft or more from cap to ground, turn the bend out from the plumb or inside batter pile. Never turn the bend at right angles to the bent.

WORLD'S MOST DEPENDABLE...

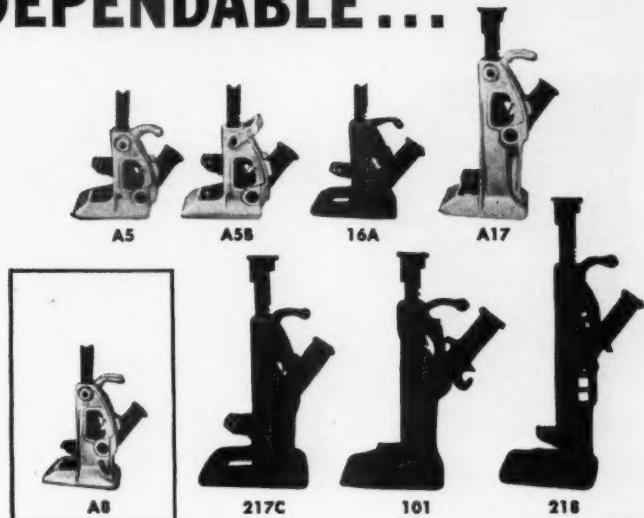
SIMPLEX

TRACK JACKS

New Model No. A8, eliminates need for both high and low lift jacks. 15-ton capacity, 15 $\frac{5}{8}$ " high with 7 $\frac{3}{4}$ " lift. The fulcrum center is 3" higher than 5" lift jacks. Has 2" min. toe-lift height, weighs only 34 lbs.

WORLD'S LARGEST MFGRS. OF INDUSTRIAL MECHANICAL AND HYDRAULIC JACKS

SIMPLEX
RE-MO-TROL JACKS JENNY
UTL-A-TOOL BOL-TOE



- Most complete line—14 models
- Available with malleable or aluminum alloy housings
- Large area (2 $\frac{1}{2}$ " x 3 $\frac{1}{4}$ ") lifting toe has non-slip grooves
- Lifting ranges from 5 inches to 19 inches
- Thumb guards and trips on both sides
- Lowest toe height—less digging or pounding to set jack

ALSO AVAILABLE—Rail Pullers and Expanders, Tie Spacers, Rail Dollies, Tie Removers and Replacers, Bridge Jacks, Jack Supports, Push and Pull Jacks, Steamboat Ratchets and a complete line of Hydraulic Jacks—Rams, Pumps (hand or powered), Pullers and Accessories.

TEMPLETON, KENLY & CO. • 2543 GARDNER RD. • BROADVIEW, ILLINOIS

In The Yard...

or On The Line

BURRO

WORK POWER PAYS!

When a BURRO goes to work — in the yard or on the line — it delivers fast, low cost performance. Equipped with bucket, magnet, hook, tongs or dragline bucket, a BURRO is ready and able to do the hundreds of odd jobs railroad work calls for. Fast travel speeds (up to 22 mph.) and heavy draw bar pull enable the BURRO to move itself and a work train or cars to the job in a hurry. Once on the job, a BURRO wastes no time getting the work done. BURRO's work power pays dividends every day it operates.

Write for illustrated BURRO Catalogs

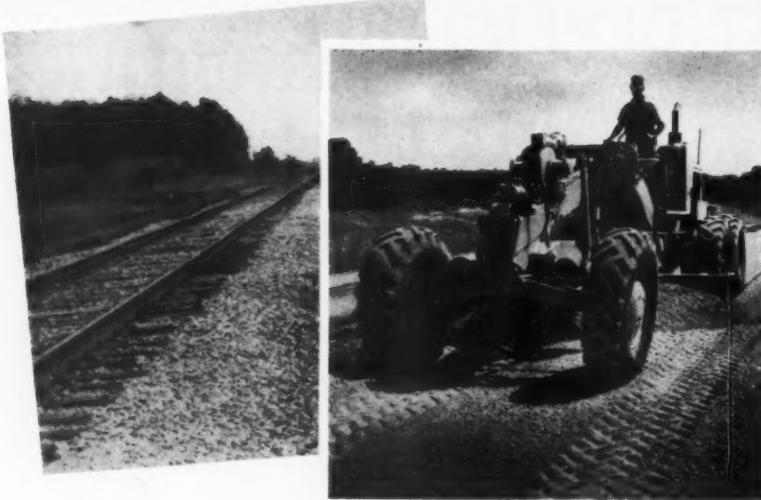
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SYLVESTER STEEL PRODUCTS CO., LTD.
LINDSAY, ONTARIO





This maintenance machine is not tied to your tracks

A fast, mobile L-W grader will help keep your right-of-way, yard, and road maintenance up-to-date. It can fix small troubles before they become major problems. Saves time, and the extra expense you'd incur, by postponing for work-train service.

There's no waiting for rail transportation...no need for special equipment or crews. One man, operating an Adams^t, drives via highway, or on right-of-way, to handle work at various points along your line.

At the job-site, grader can cut and clean ditches, widen embankments, remove brush and weed growth. It can slope banks, level fill, build grade for sidings, spread ballast, grade access roads...clean-up around stockpiles, coal docks, shops, yards. Also plows snow, and handles many other jobs.

L-W Adams gives you more work-power

Size-for-size, LeTourneau-Westinghouse Adams graders provide more gear ratios and higher speeds than other graders. With more combinations of power and speed, your operator can always grade at, or near, full rpm engine power...can save extra time when backing-up, traveling and maneuvering.

Heavy-duty 80 to 160-hp L-W graders provide 15 full-power speeds to 26 mph

...8 forward, 4 reverse, 3 (optional) creeper gears. Utility-weight 60-hp model is also best in its class, with 10 speeds including creepers. And big 135 and 190-hp POWER-Flow® 550 and 660 models with torque converter give you the effective work-power of infinite gear ratios to 27.4 mph.

Optional equipment adds utility

Scarifier rips-up old asphalt, hard-packed dirt, roots, and stones. Dozer blade roots-out brush, pushes debris off right-of-way, backfills around culverts, cleans-up spillage in yards. Snow plow and wing clear heavy snow.

Ask us for complete information.



Slopes banks up to 90°

An L-W Adams grader is handy for erosion control along right-of-way slopes, or building new embankments. Blade shifts out and up to grade banks at any angle to 90° vertical, reaching 12½' high. On the level, blade reach is approximately 7½' beyond wheels.

^tTrademark G-1886-RR-2/3

LETOURNEAU-WESTINGHOUSE COMPANY



Railroad Sales Division
Peoria, Illinois
A Subsidiary of Westinghouse Air Brake Company
Where quality is a habit



What's the answer? (cont'd)

I always set the tip of my crooked pile in the same location as I would a straight pile. Sometimes it will be difficult to get the pile into the leads with the bend turned at right angle to the track. But this can be done by moving the leads to the right or left, whichever is necessary. Often the pile will have to be turned to get it into the leads and then forced back into position after it is caught under the hammer. This can be accomplished by allowing the follow-block to catch the top of the pile, but with the weight of the hammer held off the pile until it is returned.

After the hammer is placed on top of the pile, the leads can be moved back to proper distance from center of the track for driving. The bottom of the leads pressing against the bend will spring it about 30 per cent or more, depending on the size of the pile being driven.

In setting the pile, consideration should be given as to where the bend will be after the pile is driven. If the full length of the pile will be used, the leads should be set in the proper location for the head of the pile. While driving, the bend will be very much out of line at times, but the head will be at its proper location, and should not move but a few inches after the hammer is removed.

Hit the pile lightly for the first few blows. If it begins to turn have two men hold it with cant hooks a few feet above the ground, bracing it in both directions. The cant hooks should be used on the pile near the top of the ground or water, so that the scars from the hooks will be under the surface after driving.

I always drive my outside batter pile first, and stay them on 12-ft 6-in centers, or whatever length my spans may be, before moving the hammer off the pile. This side stay is used for scaffold for cutting off the bent. With the batter pile in proper position, the plumb pile or inside batter piles can be pulled into line. This makes a very uniform bent.

I watch my hammer very closely while driving a crooked pile, and move my leads to the right or left, and the machine forward or backward, whichever is necessary. In hard driving this can be done without stopping the hammer.



Powerful Spring Compression and 4-Point Symmetrical Grip make the

WOODINGS Advanced Type RAIL ANCHOR

- ★ **BEST** for welded rail
- ★ **BEST** for machine application
- ★ **BEST** for reapplication value

GET THE FACTS!



WOODINGS FORGE & TOOL COMPANY

Main Offices and Plant: Verona, Pa. • Sales Offices: Chicago, Ill., St. Louis, Mo.



Now available... Coast-to-coast!

HYKIL WEED KILLERS

THE ORIGINAL AROMATIC OIL-TYPE HERBICIDE



● Precision Spraying Equipment



● Flexible . . . for any requirement



● Effective Weed/Brush Control

HYKIL maintains three programs for specialized railroad vegetation-control; all backed by years of experience in the field:

1. **MADE-TO-ORDER HERBICIDES** to meet any individual vegetation-control problem, for application by your forces.
2. **CONTRACT APPLICATION** of these specialized herbicides, using the finest possible equipment, and flexible enough to do the job quickly and efficiently.
3. **CUSTOM-DESIGNED Spraying Equipment** for installation in your own cars when you desire to apply the weed-control products.

Now, **WHENEVER** you have a vegetation-control problem, there is a HYKIL supply point nearby, from which the weed killer best suited for your spraying job can be shipped immediately. And HYKIL weed killers' low cost makes them ideally suited where economy is a must!

HYKIL herbicides are backed by years of experience in specialized railroad vegetation-control.

If you have a weed problem today, write, wire or phone NOW . . . before finalizing your 1960 program!

W.T. Cox Company

INCORPORATED
1021 FRUIT STREET
SANTA ANA, CALIF.

2200 WEST 75TH STREET
KANSAS CITY 15, MO.

2245

54 FEBRUARY, 1960

What's the answer? (cont'd)

Use of large and small crossties

Are there any advantages in the use of oversized crossties? Undersized? Any disadvantages? Does the volume of traffic, kind of ballast or today's track machines make any difference? Explain.

Use one size ties

By W. W. STEWART
Supervisor
Central of New Jersey
Ashley, Pa.

In my opinion, there are no advantages in the use of oversized crossties. In maintaining a roadbed, the use of certain sized ties and tie plates are very important. I find that 8-in by 9-in by 6-ft 6-in ties enable the type of track machines we have to perform more satisfactory.

With this size tie there can be more ties loaded into a car for shipment from the creosoting plant to us. The work of unloading ties of this size is less hazardous.

In renewing oversized ties in a spot-in program where cinder ballast is still used, there is more time lost in trying to get the old oversized tie out from under the track. The tie crib must be dug deeper, the track must be raised higher. Where stone ballast is used, the time element is still greater, sometimes causing traffic delays.

The average tie plate is approximately 7½ in wide and 12½ in long and it places most of the load or weight on the area of the tie directly under the tie plate itself. The rest of the tie becomes waste. In hand or machine tamping, the larger ties are sometimes not tamped in the center, leaving a water pocket to form, causing, in time, sloppy or rough tracks.

Stick to standard ties

By ROADMASTER

There was a time when foremen made a distinction between the oversized, standard and undersized ties. Many foremen separated the oversized ties and used them for joint ties. The



World's Most Versatile Tamper



NEW

McWilliams

MULTI-PURPOSE 8

With ballast compaction equal to the McWilliams Production Tamper, the machine tamps under the tie in sixteen positions—each tool tamping in two places. Speed in production tamping: up to 4 ties per minute. As a Spot Tamper, split head with integral jacks assures effective tamping of joints, low spots, switches and in yard and terminal work. As a Combination Jack and Out-of-Face Tamper, the machine will operate as a jack tamper in making out-of-face raises, finish tamping ties at jacking points. It then can go back and finish tamp the remaining ties—making possible out-of-face tamping with one machine, an operator and a foreman for sighting the raise. Ask for details.

Railway Maintenance Corporation

PITTSBURGH 30, PA.

Track Stays up Longer with a McWilliams Tamper

A PRODUCTION TAMPER

A SPOT TAMPER

A JACK TAMPER



Tools tamp in the same pattern as the McWilliams Production Tamper



Austin-Western hydraulic crane makes accurate placement of rails faster, safer.

Detroit & Mackinac speeds track laying, reduces crew costs with A-W 210 crane

Austin-Western's hydraulic crane is "... more efficient, faster and easier to handle than a smaller capacity fork lift or much larger locomotive crane!" So says Wm. L. Groff, manager of Detroit and Mackinac Railway's Huron Wood Preserving Division, Tawas City, Mich.

Proves versatility

He adds, "We began using the crane two years ago to speed handling of ties, poles and timber in our pressure treating process. It proved so versatile and efficient that we use it for all kinds of materials handling.

"Our parent company, the D&M railway, has probably made the most spectacular savings with the crane. D&M rents it from us to handle, load and place ties and rails when laying track. The precision of the hydraulic controls makes tie and rail placement accurate, speedy and safe.

With the A-W crane as a member of the gang, only 20 men are required per shift on a track-laying crew instead of 28 or 30!

Costs are below estimates

"Our A-W crane with 4-wheel drive and 4-wheel steering is highly maneuverable. It goes almost anywhere . . . over track, under doorways or piping.

"Maintenance and repair costs have been much lower than the \$3.61 average daily allowance set up in our cost table. It is used an average of 5 hours daily at a cost of only \$27.03!"

The unit is rubber-mounted, self-propelled. Choice of power. 18-ft. telescoping boom rotates in full circle. On-and-off track attachment optional. Get documented facts and figures on the A-W crane in the Detroit & Mackinac operation. Send today for complete details.

Austin 100TH YEAR
PARTNERS IN PROGRESS **Western**
CONSTRUCTION EQUIPMENT DIVISION, AURORA, ILL.
BALDWIN • LIMA • HAMILTON

Power graders • Motor sweepers • Road rollers • Hydraulic cranes



What's the answer? (cont'd)

reason for this was to obtain the widest and best bearing where traffic impacts made this essential. Also, it was one way to be certain that no undersized ties were placed at such locations. As a matter of fact, this practice grew from the variation in the sizes of ties received.

Today, most railroads specify the No. 4 and No. 5 tie sizes for main-track use. For light-traffic branch lines, some roads will use the No. 3A size ties. These sizes are all 7 in thick and the No. 5's are 9 in wide and the others 8 in wide.

In the past, we used to receive tie plates of various widths and lengths. When 6-in wide plates were being used, it was possible to use this plate on ties 6 in wide without impairing the holding power of the spikes.

However, tie plates have been pretty well standardized at the 7 3/4-in width. Hence, no tie less than this width should be used. Trackmen have a hard time positioning plates on narrower ties and there is the possibility of getting the spike holes too close to the edge of such ties.

In my opinion, whenever standard tie plates of the 7 3/4-in width are used, no ties less than 8 in wide should be applied. Where anchor spikes are used, they will be about 1 1/4 in from the edge of the tie, provided the plate is centered on the tie. If not centered properly, then the anchor spike again gets too close to the edge of the tie, inviting the tendency to split. It is my belief that we had better stick to our standard No. 5 and No. 4 ties. The production tampers in use today are made to tamp such ties.

I have no use for the undersized ties—not even for side tracks. You cannot get trackmen to consistently place the plates properly on them and too many ties split while driving the spikes. They might better be used as fence posts.

Supply trade news (cont'd)

(Continued from page 10)

with the company's new program of product-line selling designed to make its products and facilities more readily available to all of the branches of industry which it serves.

(More on page 58)



The mowers that chew up heavy brush...

center-mounted heavy-duty International® Danco rotaries

Is dense, tangled, hard-control overgrowth giving you a serious maintenance problem? Then, be sure to investigate heavy-duty International Danco rotary mowers mounted on IH tractors. These outstanding combinations of power and amazing cutting capacity provide positive brush and weed

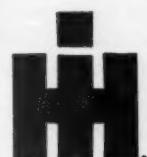


Tremendous cutting power of International Danco rotaries and IH tractors quickly pulverizes saplings, heavy brush, and rank weeds. Shown is the 45-hp* F-340 with 66-inch rotary. Three-spindle model on 61-hp* F-460 cuts a 94-inch swath.

* Maximum flywheel hp at standard sea level conditions.

control at surprisingly low cost. Center-mounting produces a safer, better wheel grip to mow side slopes as steep as 2:1. Exclusive non-wrap spindles insure non-stop mowing even in wet or wiry growth. Level-lift feature lets operator change cutting height on-the-go. Optional 10-speed Torque Amplifier drive gives him the speed he wants. You'll get extra seasons of the best mowing performance you've ever known with one of these versatile, heavy-duty units.

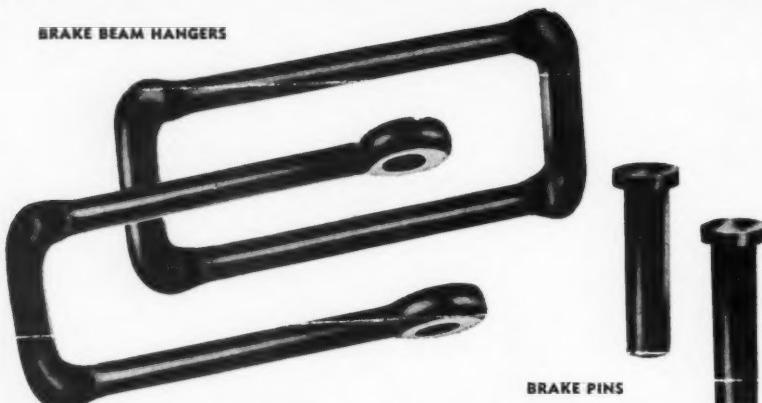
Let your nearby IH dealer show you why International Danco rotaries and IH tractors are your most productive, most dependable, and safest choice in mowers. 58 to 94-inch cutting widths available. For dealer's name and specification sheets, write International Harvester Company, Dept. RTS-2, P. O. Box 7333, Chicago 80, Illinois.



**INTERNATIONAL
HARVESTER**

International Harvester Products pay for themselves in use—Farm Tractors and Equipment...Twine...Industrial Tractors...Motor Trucks...Construction Equipment—General Offices, Chicago 1, Illinois.

Brake Beam Hangers



"EXTRA" METAL AT CRITICAL POINTS IDENTIFY FLANNERY BRAKE BEAM HANGERS

Flannery provides additional metal at points where most wear occurs to upgrade operational safety and extend brake service life. Even after heavy use, a greater amount of cross-sectional metal remains on Flannery units than on most conventional AAR-approved brake beam hangers. Carefully selected steel, heat treated at controlled temperatures, assure maximum service life. "U" type Flannery hangers available in six to eighteen inch lengths; "Loop" types from eight to fourteen inches. Round and square-head Flannery Brake Pins furnished in any desired length.

FLANNERY PRODUCTS CORPORATION RAILROAD SPECIALTIES

P. O. BOX 5103, NEWARK 5, N. J., Telephone MARKet 3-0333 / PLANT: BAYONNE, N. J.

Supply trade news (cont'd)



Charles Milnar
AH&D



Thomas I. Moore
Q & C

AMERICAN HOIST & DERRICK CO.—Robert P. Fox and E. W. Taylor have been appointed chief engineer—revolver cranes, hoists and derricks, and manager, Engineered Projects Division, respectively.

Charles Milnar has been promoted to the newly created position of chief service engineer of the Customer Service Division, according to an announcement by **Gunner A. Johnson**, manager of the division.

Q&C CO.—**Thomas I. Moore** has been appointed western sales manager at Chicago.

THE RAILS COMPANY—G. N. Burwell has been elected vice president at Maplewood, N. J. F. W. Schmidt has been elected district manager at Chicago.

MATISA RAILWELD, INC.—This company has contracted for a site for a rail-welding plant at Bessemer, Ala., adjacent to the rail mill in that area of the Tennessee Coal & Iron Division of the United States Steel Corporation, according to an announcement. Welded rail will be in production some time in May of this year, and the plant will provide a contract service to the railroads at a total cost per joint less than that of the conventional bolted joint, said Robert P. Underwood, vice-president and general manager of Matisa Railweld.

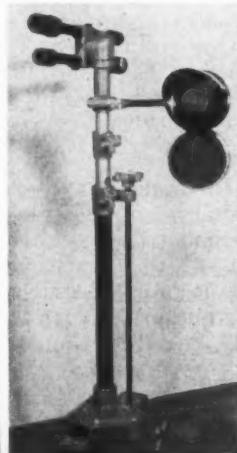
It was pointed out that the service will be available to all railroads obtaining their rail from that area, regardless of size, since the company will supply all equipment and services and make it possible, if the road desires, to obtain the special cars necessary for carrying continuous welded rail. The welded rail will be supplied in all lengths from 78 ft to $\frac{1}{4}$ mile at one fixed cost, said the announcement.

NATIONAL CYLINDER GAS DIV., CHEMETRON CORP.—A plant for butt-welding sections of rail immediately upon their emergence from the rolling mill is expected to be completed at Minnequa, Colo., in February, according to an announcement by Chemetron Corporation. The plant will be located adjacent to the mill of the Colorado Fuel & Iron Corp. When it is in operation the railroads will be able to obtain welded rail "faster and more economically," said Robert A. Baer, head of the railroad equipment department of Chemetron's National Cylinder Gas Division.

From the rolling mill the standard 39-ft rails will move directly into the new plant to be welded into sections anywhere from 78 ft to a quarter of a mile long, the announcement said. The sections will be

More popular than ever

Hayco Lining Scope sales in 1959 were double those of '58. Are you overlooking this simple, accurate track lining device?



The two men in the photo above line 4,000 ft. of track a day . . . accurately. The Hayco Lining Scope, key to this "first-time-over" accuracy, costs less than \$250.00 and any track man can use it in minutes. Sight sitting or standing. All-aluminum. Comes with Carrying Case. Write today for Circular.
"The straightest line is the line of sight"



The Brice Hayes Co.
6710 NORTHWEST HIGHWAY
CHICAGO 31, ILL.

BANTAM RAIL-ROADER®

The All-Purpose Handy Man
ON Track AND OFF



Here's the first really all-around rig that can speed up your maintenance-of-way and yard work—and pass on real savings to you. The carrier mounted BANTAM Rail-Roader is the most versatile multi-purpose machine you can own because it can go anywhere to do more jobs.

BANTAM's integrated design job-matches both carrier and upper machinery for stepped-up work speeds on redecking, bridge restringing, cap changes and ribbon-rail operation. And because the BANTAM Rail-Roader is the only *true* on-off track crane-excavator, you can get the same high-speed work cycles for ditching, loading, materials-handling, etc.—saving the cost of many single-purpose rigs.

Look at all that's BANTAM-best

1. Big 8-ton capacity.
2. Rubber-tired mobility off track as well as high-speed on-



BANTAM's rapid rail travel gets it to jobs faster. For off-track work, dolly wheels are fully retractable for permit-free road travel.

track performance through BANTAM's unique flanged dolly wheel system.

3. Remote control (optional) of all operations of carrier and upper from the operator's cab.
4. Full 360-degree vision.
5. Equal track speeds both forward and reverse—rapid highway travel.
6. Mechanically operated dolly wheels and outriggers that cut maintenance.
7. Exclusive BANTAM Rail Threader (patent pending)—threads in ribbon rail between existing tracks faster, smoother. BANTAM positions new rail to gauge in one operation!
8. Eleven quick-change attachments to let you do everything from pile-driving to stockpiling.

You can join the modern railroads that are realizing important savings with the BANTAM Rail-Roader. Ask for the name of your BANTAM Rail-Roader Distributor and new literature.

See the BANTAM Rail-Roader in action: Arrange a showing of new color films that demonstrate BANTAM's amazing job speed and versatility for B&M and track departments.

Read the facts: New, illustrated bulletin has full information, specifications and application photos. Write for Catalog RR-200.

RT-271



284 Park Street, Waverly, Iowa

World's largest producer of truck crane-excavators

**Does work
of 6 men**

ROWCO
BRUSHKING

Rowco's portable power driven brushcutter is designed for rugged terrain . . . cleans out brush up to 4" in diameter at ground level. Safe, dependable . . . Rowco's BRUSHKING is a real worksaver. Write today for name of your distributor — Thousands in use. Literature for your asking.



GRASS TRIMMING
ATTACHMENT

ROWCO

MFG. CO., Inc.
EMERALD STREET
KEENE, NEW HAMPSHIRE

Please send complete information on the Rowco Brushking.

NAME _____

STREET & NO. _____

CITY & STATE _____

Supply trade news (cont'd)

shipped on flat cars or in gondolas to the points where they are to be laid. William S. Boyce, general manager of railroad sales for Colorado Fuel & Iron, said the cooperative innovation will provide a new, improved service for railroad customers of the steel mill.

The announcement stated that welding of the rail at the site of the rolling mill not only eliminates the expenses of moving equipment from job to job, but permits permanent use of a well-trained welding crew and assures a constant supply of rails to be welded.

Association News

Metropolitan Maintenance of Way Club

The February meeting will be held on the 25th at the Railroad & Machinery Club, 30 Church Street, New York, with dinner starting at 6:30 pm. The principal speaker will be T. M. Goodfellow, president of the Long Island, who will tell how the maintenance of way department fits into the overall operation of the Long Island.

Northwest Maintenance of Way Club

The next meeting of the club will be held on February 18 at the usual location, Coleman's Cafe, 2239 Ford Parkway, St. Paul. Principal feature of the program will be a panel discussion on "Chemical control of vegetation." Cleston G. Parris will be the moderator of the panel which will consist of representatives from eight chemical supply companies. Until recently (see announcement on page 10) Mr. Parris was agronomist on the research staff of the AAR at Chicago.

Maintenance of Way Club of Chicago

J. M. Trissal, vice president and chief engineer of the Illinois Central, will be the speaker at the next meeting of the club, which will be held on February 29 at the Hamilton Hotel, Chicago. He will talk on "Problems caused by the highway program — What are we doing about them?"

American Railway Engineering Association

Two standing committees have scheduled meetings to be held in February. These are: Wood Bridges and Trestles, February 4-5, Sheraton Charles Hotel, New Orleans, La., including an inspection trip to observe deck replacement work on the Huey Long bridge over the Mississippi river; and Impact and Bridge Stresses, February 16, AAR Research Center, Chicago.

The annual convention of the association will be held at the Sherman Hotel, Chicago, March 14-16. A skeleton program follows:

Sunday, March 13

Pre-convention registration, mezzanine floor, 10 am-3 pm

Monday, March 14

Registration, mezzanine floor, 7:30 am (Grand Ballroom, 9:00-12:00)

Address by President F. R. Woolford
Report of Secretary and Treasurer
Keynote address by C. D. Buford, Vice President, Operations and Maintenance Department, AAR

Symposium on Standardization

Address by D. W. Brosnan, Vice President Operation, Southern

(Grand Ballroom, 1:30-5:30)

Reports of Committees

28—Clearances

Address by H. A. Mosher, President, National Society of Professional Engineers

Address by W. T. Eskew, Jr., Assistant General Manager, Southern Pacific Pipe Lines, Inc.

20—Contract Forms

11—Engineering and Valuation Records

14—Yards and Terminals

16—Economics of Railway Location and Operation

25—Waterways and Harbors

Tuesday, March 15

(George Bernard Shaw Room, 8:30-11:55)

Reports of Committees

13—Water, Oil and Sanitation Services

24—Cooperative Relations with Universities

7—Wood Bridges and Trestles

8—Masonry

30—Impact and Bridge Stresses

15—Iron and Steel Structures

29—Waterproofing

ASSOCIATION LUNCHEON, 12:00 NOON

(Grand Ballroom)

Presentation of gavels to new committee chairmen

Announcement of results of election of officers

Address by F. B. Whitman, President, Western Pacific

(George Bernard Shaw Room, 2:15-5:30)

Reports of Committees

6—Buildings

9—Highways

17—Wood Preservation

3—Ties

27—Maintenance of Way Work Equipment

22—Economics of Railway Labor

Wednesday, March 16

(Grand Ballroom, 8:30-12:00)

Reports of Committees

1—Roadway and Ballast

4—Rail

Special Committee on Continuous Welded Rail

5—Track

Closing Business Session

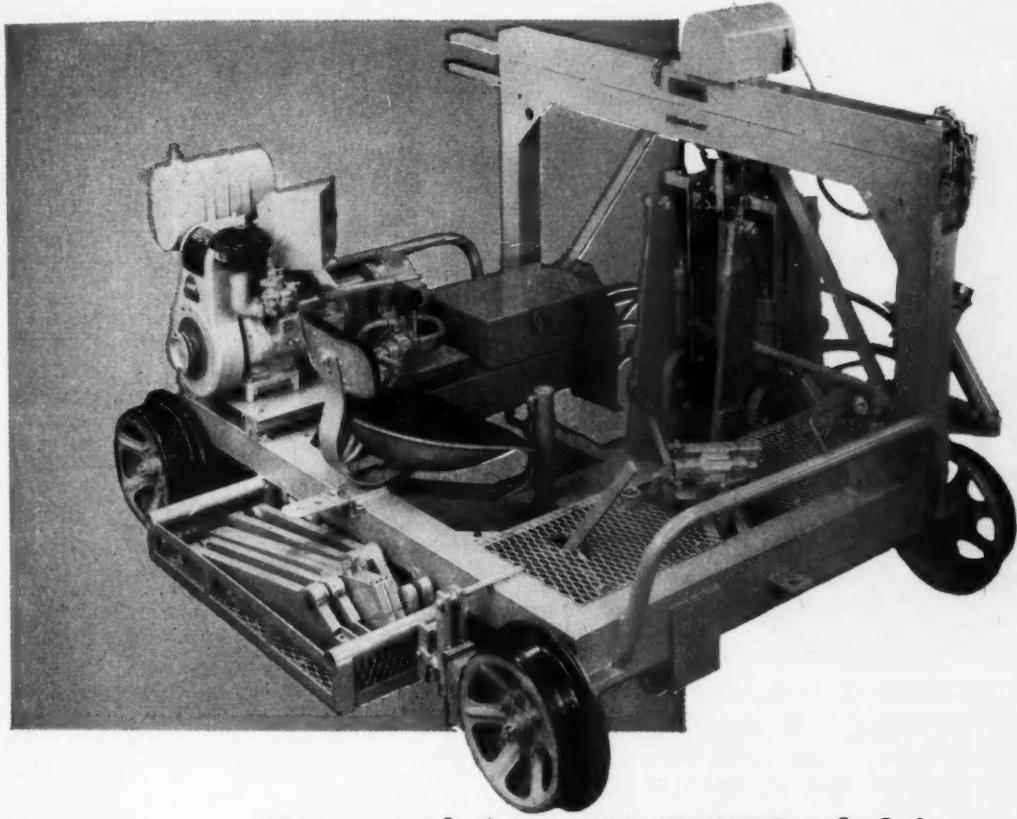
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"Anchor Fast" ANCHOR APPLICATOR



For applying ALL TYPES of drive-on
or tool applied hang-on anchors

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- Smooth hydraulic pressure with adjustable stops, prevents over driving.
- Positive anchor-to-tie application.
- Machine can be used for either single or box anchoring.
- Powered by a 9.2 hp gas engine with clutch and reduction gear.
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Yes, IGLOO Water Coolers will save you money. They keep more men on the job more of the time, pay off in employee relations and require no maintenance other than the rinsing any drinking container would require. There should be an IGLOO strategically located for every six to eight workers.

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Helps from Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

ELECTRIC PLANTS. A folder is available on the various types and capacities of Kohler electric plants. Folder E-344 shows air-cooled, gasoline-engine plants from 500 to 5000 watts ac, including a 2500-watt ac plant that can be operated at 60 and 100 cycles. Other types and models include liquid-cooled, gasoline-engine models from 2000 to 15,000 watts ac and dc and 25,000 to 100,000 watts ac; air-cooled, diesel-engine models from 2000 to 7500 watts ac; and liquid-cooled, diesel-engine models from 10,000 to 15,000 watts ac and dc and from 25,000 to 100,000 watts ac. The folder illustrates a two-wheeled cart and a two or four-wheeled trailer which are available for use with certain models. (Write: Kohler Company, Dept. RTS, Kohler, Wis.)

TRUCK CRANE. The operating and mechanical features of the 22½-ton capacity American 200 Series truck crane are described and illustrated in a 20-page catalog. Designated 732-TG-1, the catalog includes a number of on-the-job photographs showing the machine doing various kinds of jobs. Attachments available for use with it are described and illustrated, including backhoe, dragline, clamshell and shovel. Also described is the two-speed transmission for the control of boom and line and the retractable high gantry. A series of diagrams shows how the rear outriggers are removed for transporting from one job to another. (Write: American Hoist & Derrick Co., Dept. RTS, 63 South Robert St., St. Paul 7, Minn.)

WELDING ELECTRODES. A new 64-page edition of the Airco "Electrode Pocket Guide" is available. It contains information on all types of Airco electrodes, including mild steel, low alloy, low hydrogen, iron powder, stainless steel, hardfacing, non-ferrous, and cast iron. A brief description of each is given along with applications, procedures and pertinent AWS-ASTM data. Two eight-page foldouts in the back of the new edition contain charts of recommended electrodes for welding various types of steel and comparison tables for mild steel and hardfacing electrodes. (Write: Air Reduction Sales Company, Dept. RTS, 19 East 42nd St., New York 17.)

ROOF COATINGS. A new eight-page brochure is available which describes the new line of Supercote aluminum roof coatings. The brochure contains specifications and details for applying the roof coatings on new or old roofs of felt, composition or metal and on corrugated surfaces. Features of the new material are pointed out, as are the advantages of its use. The brochure also describes the use of Banoxol for keeping roofs "alive," Pliox for restoring flexibility to old roof coverings, Microtex for resisting heat, cold and ultra-violet rays, and fibre glass for resisting flow and tension of the roof coatings. (Write: The Garland Company, Dept. RTS, 3748 East 91st St., Cleveland 5, Ohio.)

CONTAINERS. Two catalogs are available which describe the entire line of Eagle oilers, safety cans and oil and gasoline containers. Designated No. 60 General and No. 60-C Condensed, the catalogs make extensive use of pictures to illustrate the various types and kinds of containers available. The manufacturer states that the containers are used by railroads, factories, service stations, repairmen, farmers, home owners, handymen and sportsmen. (Write: Eagle Manufacturing Company, Dept. RTS, 29 Charles St., Wellsburg, W. Va.)

MASONRY SAWS. The newly expanded line of Truco masonry and concrete cutting equipment is described and illustrated in a folder now available. The folder describes various types of saws, including standard and heavy-duty masonry saws, a self-propelled concrete saw and a lightweight, heavy-duty stone-cutting saw. Also described is the company's line of abrasive and diamond cutting blades, portable diamond drilling machines and diamond drill bits. (Write: Wheel Trueing Tool Company, Truco Masonry Drilling Division, Dept. RTS, 3200 West Davison St., Detroit 38, Mich.)



This secondary line track of the Western Maryland Railway was treated with Du Pont "Telvar" at 15 lbs./acre in combination with other weed killers. Note the type of vegetation nearby and the sharp contrast beyond treated area at right.

Keep roadbeds clean all season long ... base your weed program on Du Pont Weed Killers

To clean up weeds and grass on your roadbeds and rights-of-way effectively and economically, use Du Pont "Telvar" monuron or "Karmex" diuron weed killers—either separately or in combination with other weed killers. Just one application of these herbicides controls weeds for a season or longer, cuts maintenance costs considerably. And both provide long-lasting, residual action that often permits lower application rates in succeeding years. "Telvar" and "Karmex" are easy-to-mix wettable powders—and are non-flammable, non-volatile, non-corrosive and low in toxicity to man and animals.

Choice of "Telvar" or "Karmex" depends on soil types and moisture conditions. For information on which one meets your requirements best and assistance in maintaining an effective, low-cost weed control program, write: Du Pont, 2543 Nemours Bldg., Wilmington 98, Delaware. In Canada: Du Pont of Canada, Ltd., P. O. Box 660, Montreal, P.Q.

On all chemicals, always follow label instructions and warnings carefully.



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weed killer

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weed and
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weed killer

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NOLAN Tool and Supply CAR



2000 pounds capacity. Takes tools and supplies to the job from truck or bus. All tubular high-carbon steel construction, designed to safely carry heavy loads of ties, rails, supplies and tools.

The car breaks conveniently in the center into two sections for easy handling and transportation. Easily and quickly unhooked or hooked together. Each section can be used for a truck seat.

The deck is heavy mesh-expanded steel. Removable handle can be used at either end. Ball bearing cast steel wheels.

Platform Size 48"x45"

Height Above Rail 8"

Weight 140 lbs. complete

NOLAN TRACK DOLLY ▶

The fast, safe, easy way to transport heavy rails, ties, supplies, tools, railcars, etc. Tubular high-carbon steel construction. The deck is heavy mesh-expanded steel. Removable handle.

STANDARD DOLLY

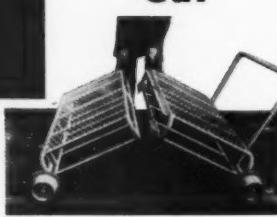
Length	Width	Rail	Weight
50½ in.	15½ in.	6½ in.	88 lbs.

INSPECTOR'S DOLLY

Length	Width	Rail	Weight
36 in.	14 in.	6 in.	60 lbs.

FREE CATALOG—Write THE NOLAN COMPANY, 166 Pennsylvania St., Bowersville, Ohio

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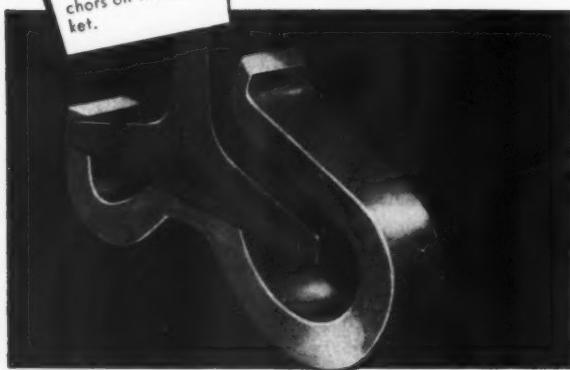


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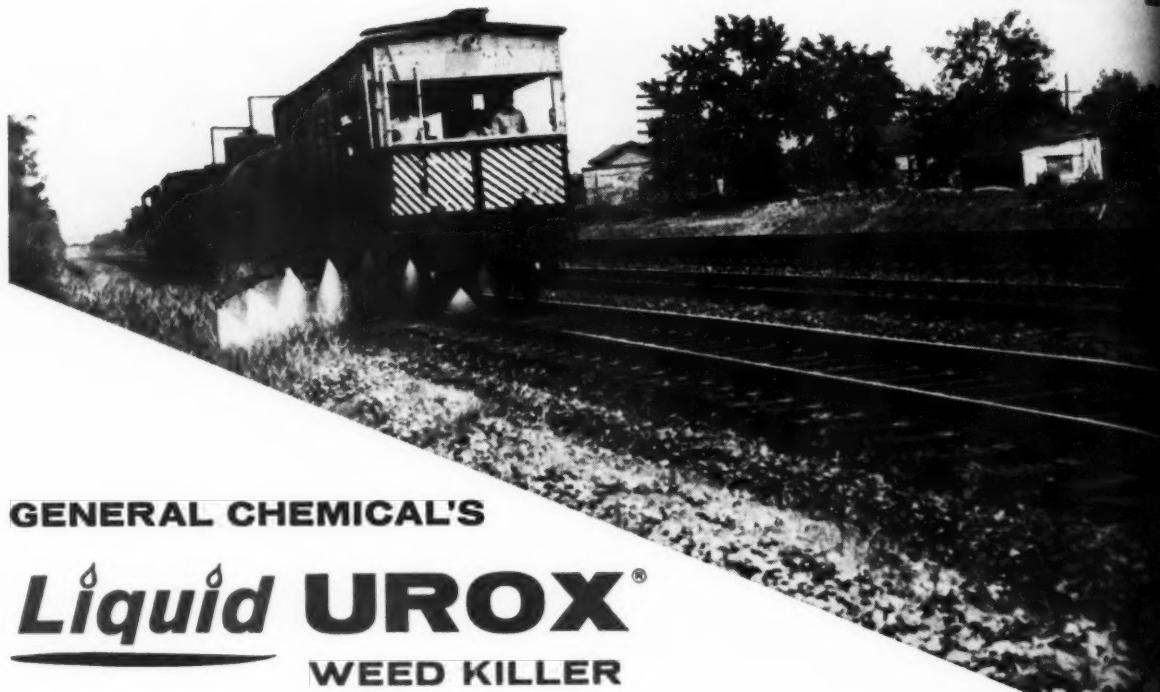
NATIONAL Railway Spring Washers are designed to keep bolts tighter by maintaining constant bolt tension, absorbing shocks and protecting rail ends. They withstand the extreme stresses and strains of continuous, heavy traffic... reduce maintenance costs system-wide!

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with this exciting new development
in railroad weed control



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WEED KILLER

New! The first liquid substituted urea weed killer ever developed for use on railroads.

Kills Weeds Faster! Kills visible weed growth fast regardless of weather, usually within 10 to 12 hours. Compare this fast action with other weed killers which take up to 2 weeks to kill. Gives superior control of grass and "resistant" weed species.

Longer Lasting! UROX tends to build up in soil. Its herbicidal action can thus be extended from one year to the next with light booster doses. As smaller and smaller amounts are used over a period of time, you realize substantial savings.

Easier to Use! Does not precipitate out in the tank! Won't clog spray strainers or nozzles! Stays in solution perfectly! For best results, use liquid UROX in fuel oil, diesel oil, or ordinary weed oils.

Proved!* Liquid UROX has been tested since 1956 with consistently superior results. Prove it yourself!

Now you can wipe out railroad weeds *faster, easier, at lower cost and for a longer time* with General Chemical's new liquid UROX. This powerful liquid

herbicide is especially well suited for large scale spraying along railroad tracks. Liquid UROX can be shipped to you conveniently by rail in tank cars and then sprayed out from the same cars. Write today for further information, or ask to have a representative call.

For easier, longer-lasting small scale weed control—such as in railroad yards, around terminals, stations and storage depots—use UROX Weed Killer in the dry, granular form. Any mechanical seed-type spreader or similar device can be used as long as it spreads the desired amount evenly over the area to be treated.

*Roadway and Ballast Committee of American Railway Engineering Association reports: "The addition of monuron-TCA [UROX] to the oil . . . gave the quick kill of the oil followed by long residual activity . . . This was one of the outstanding materials . . . giving excellent control of both grasses and broad-leaved weeds." ARE Bulletin 542, February 1958, p. 849.

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